DOCUMENT RESUME

ED 139 592 RC 009 928

TITLE	The Appalachian Trail: Guidelines for Preservation, Revised May 1977.
INSTITUTION	Pennsylvania State Univ., University Park. Dept. of Landscape Architecture.
SPONS AGENCY	Pennsylvania State Dept. of Community Affairs, Harrisburg.
PUB DATE	May 77
NOTE	229p.
EDRS PRICE	MF-$0.83 HC-$12.71 Plus Postage.
DESCRIPTORS	Change Strategies; *Conservation (Environment); Forestry; Geographic Location; Geology; Government Role; Guidelines; Land Acquisition; *Landscaping; *Land Use; Maps; Natural Resources; *Outdoor Education; Physical Design Needs; Preservation; Recreational Facilities; Site Analysis; *Site Development; Soil Conservation; *Trails
IDENTIFIERS	*Appalachian Trail

ABSTRACT

With increasing developmental pressure being asserted on land resources, there is a need for identifying unique areas that, once destroyed, may never be recouped. Many of the areas suffering from developmental encroachment are located on or along the Appalachian Trail, which is a continuous footpath about 2,000 miles long that follows the Appalachian mountain chain from Maine to Georgia. The Appalachian Trail Study Group has studied four areas of the Trail (Michaux State Forest, Cumberland Valley, Saint Anthony's Wilderness, and Kittatinny Mountain) and has attempted to provide a workable trail protection strategy for use by local planners and others concerned with protecting the Trail. In studying the four areas, the Study Group examined the site, alternative routes, soils, geology, vegetation, wildlife, and the amenities of the area. The strategy devised consists of five steps from the pre-development planning of land use to better design solutions for those segments passing through various land developments. Emphasizing physical design solutions, this guide recommends corridor widths for various landform vegetation and land use situations; suggests possible design solutions to specific problems that may arise; describes various legal and planning devices that may be used as part of a future overall trail protection strategy; and discusses the role of the Federal, state, and local governments. A map showing the land ownership and areas with a high potential for access is included. (NQ)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ED139592

JUN 1977
RECEIVED

RC009728

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

the appalachian trai

guidelines for preservation

the appalachian trail

guidelines for preservation

Prepared By:
Pennsylvania State University
Department of Landscape Architecture

Prepared For:
The Commonwealth of Pennsylvania
Department of Community Affairs

MILTON J. SHAPP GOVERNOR	WILLIAM H. WILCOX SECRETARY

Contents

	page
Dedication	I
Introduction	III
Ownership & Access	1
Trail Users	5
Strategy	9
Study Areas	53
Conclusions	115
References	117
Bibliography	119
Acknowledgements	121
Appendicies	125

This report was prepared in the winter of 1976 by senior Landscape Architecture students at Pennsylvania State University as a class project.

Originally printed June, 1976
Extensively revised and reprinted May, 1977

Dedication

We dedicate this report to the late Benton MacKaye, regional planner. We do so because he first expressed the idea of a wilderness footpath in an article, "The Appalachian Trail, an Experiment in Regional Planning," which appeared in the October 1921 issue of the Journal of American Institute of Architects. Since its conception and final construction, in 1933, thousands of people have been able to enjoy the unique experience provided by this man's vision and effort.

Senior Class Students
Department of Landscape Architecture
The Pennsylvania State University
University Park, Pennsylvania
1 April 1976

Introduction

INTRODUCTION

The Appalachian Trail

The Appalachian Trail is a continuous footpath about 2000 miles long which follows the Appalachian mountain chain from Katahdin, Maine to Springer Mountain, Georgia. The Trail passes through wild diversity of landscapes linking together many of the finest eastern "wilderness" environments. Hikers who travel the entire length of the Trail in one trip have the opportunity to follow the seasons from Georgia to Maine during the 3-4 month trip from spring to autumn. Approximately 200 hikers a year do the entire Appalachian Trail, and an estimated 3 million persons per year travel shorter sections of it.

The original idea for the Appalachian Trail came from Benton Mackaye, who in 1921 wrote an article in the Journal of the American Institute of Architects called, "An Appalachian Trail, an Experiment in Regional Planning." The Appalachian Trail was created during the fifteen-year period from 1922-1937, entirely through volunteer efforts of outdoor organizations and interested individuals. The project was begun by a number of New England and New York hiking clubs. In 1925, the Appalachian Trail Conference was organized by the interested organizations and individuals to carry on the project. The Trail is now primarily maintained by individuals in more than 65 trail clubs located along its length.

Historically, much of the Appalachian Trail has crossed privately owned land, with the consent of the owners. As of early 1977, 40% of the Trail lies in National Parks and Forests, 10% on state-owned land, 10% on roads, and 40% remains in private hands.

Benton MacKaye's original idea for the Appalachian Trail was to create a "greenbelt" - type of corridor to check the westward spread of the eastern metropolis, at the same time providing a recreational opportunity for millions of urban dwellers who wanted briefly to escape the city. In fact, in recent years, because so much of the Appalachian Trail is privately owned and because it is located so close to urban centers, the Trail itself has come under increasing development pressure.

This Report

Pennsylvania contains one of the most critical sections of the Appalachian Trail because of the tremendous development pressures which exist on certain portions of the Trail in the State. In 1975 the pressure on the Trail became acute, and the Commonwealth began to develop a strategy to protect the 40% of the Trail in Pennsylvania that was still privately owned.

While the Federal and State Governments have essential responsibility for the Trail, local government was also viewed as having a key role to play. In an attempt to better define the role of local government in protecting the Appalachian Trail, the Pennsylvania Department of Community Affairs provided a grant to the Pennsylvania State University in order to enable the Department of Landscape Architecture to undertake research on trail protection. This report is the result of the Penn State study. The students worked closely with staff from the Department of Community Affairs, the Department of Environmental Resources, and the Appalachian Trail Conference. The study was intended to be original research and, accordingly, the results of the study should not be regarded as necessarily the policy of the Commonwealth of Pennsylvania. However, the Department of Community Affairs, together with the Department of Environmental Resources, the Appalachian Trail Conference, and the National Park Service, feels that this study has made a significant contribution to an understanding of what can be done by local government to protect the Appalachian Trail.

This report may be utilized by local municipalities and others when solving problems that occur either along the Appalachian Trail or other trail systems within Pennsylvania. The study recommends corridor widths in various landform vegetation, and land use situations, and suggests possible design solutions to specific problems that may arise. Additionally, the study describes various legal and planning devices that may be used as part of an overall trail protection strategy for the future. All is contained in a single process developed as a guide to protect the integrity of this unique trail environment.

The Department of Community Affairs has revised and expanded the original report and is reprinting the study so that it may be widely distributed. It is hoped that the study will have applicability outside of Pennsylvania, and will make a significant contribution to the knowledge of hiking trail protection.

Ownership & Access

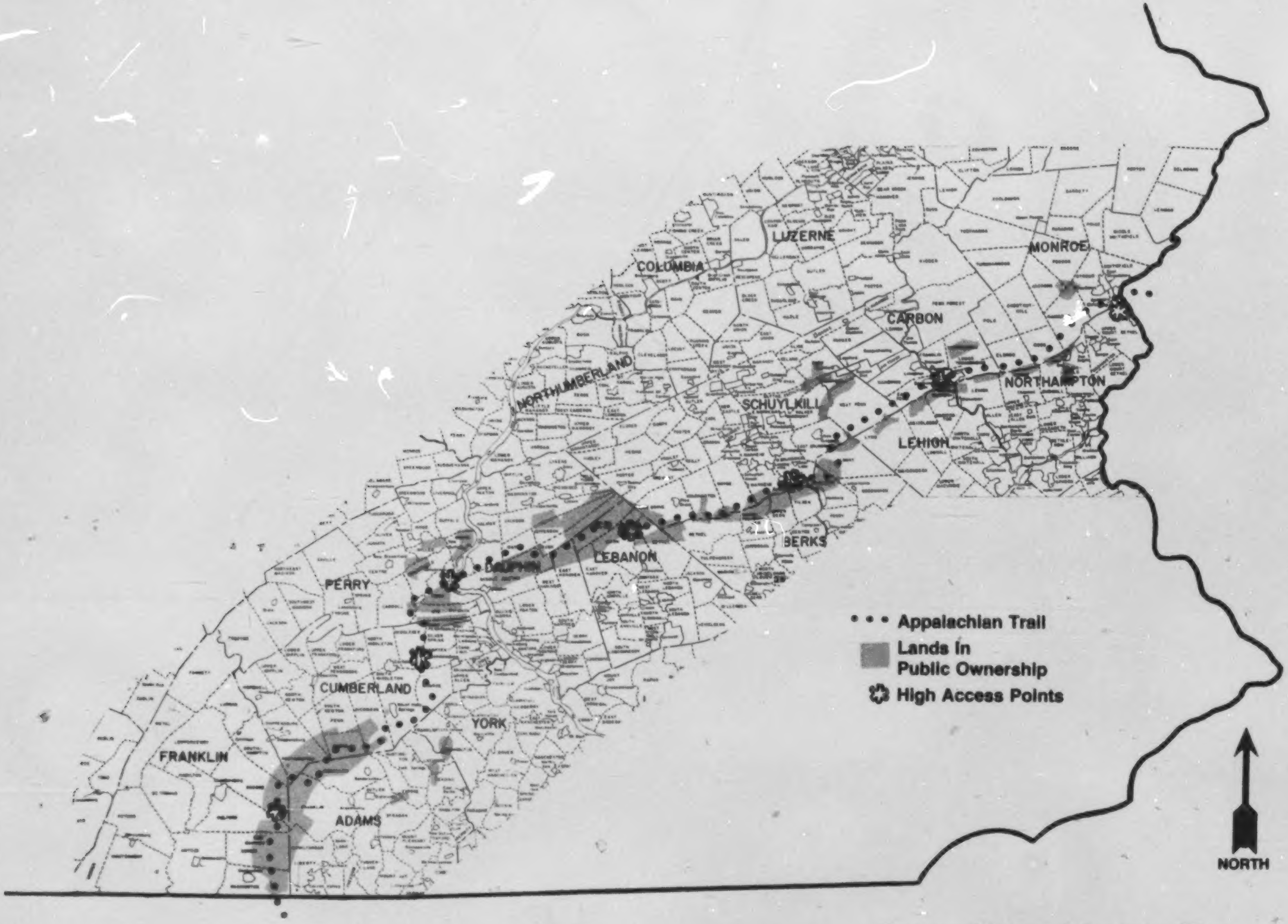
OWNERSHIP AND ACCESS

A method of measuring potential areas of development along the Appalachian Trail was considered to be important by the study group. It is in these areas that development is most likely to occur.

In determining the location of these areas, the map on the following page was prepared illustrating public and private property ownership. Property in private ownership is more difficult to control and, therefore, is subject to more developmental pressure. This is not to say that public land will not change, but the limitations on public development are more easily reviewed and restricted.

In addition to the ownership map, access to the Trail is considered of prime importance in determining developmental opportunities along the Trail. Therefore, areas with a high potential for access have been indicated on the ownership and access map.

The study group suggests that additional research into access be undertaken.


LUZERNE
MONROE
COLUMBIA
CARBON
NORTHUMBERLAND
NORTHAMPTON
SCHUYLKILL
LEHIGH
BERKS
LEBANON
DAUPHIN
PERRY
CUMBERLAND
YORK
FRANKLIN
ADAMS
• • • Appalachian Trail
▨ Lands in Public Ownership
✿ High Access Points
NORTH

Ownership and Access Map

p. 4 blank

Trail Users

Hiking has been defined as "walking of a substantial nature in which a pack containing provisions and/or shelter is carried by at least one member of the party."[1]

People who participate in hiking come from all segments of society. Their reasons for hiking, the lengths of their hikes, where they go, and what they do when they get there are as varied as the individual hikers. However they do have some basic needs, wants, and motivations in common. It is by considering these that we propose to define and analyze the hiker.

PERCENTAGE OF WILDERNESS USERS

IN VARIOUS SOCIAL AND ECONOMIC CATEGORIES[2]

Category	Percentage	Category	Percentage
OCCUPATION		YEARS HIKING EXPER. IN WILDERNESS AREAS	
Professional	54.6	1-5	27.6
Non-professional	29.6	6-10	17.8
Student (college or high)	15.8	11-20	25.0
		21+	30.0
INCOME*		NUMBER IN HIKING PARTY	
Under $5,000	10.1	1	15.1
$5,000-9,999	34.3	2	33.6
10,000-14,999	37.8	3-5	28.9
15,000+	18.2	6+	22.4
AGE		MILES TRAVELED FROM HOME	
Under 21	20.8	0-100	15.3
21-29	27.5	101-250	42.8
30-39	18.1	251-500	41.4
40-49	18.1	501+	10.5
50-59	10.0		
60+	5.4		
SEX			
Male	77.6		
Female	22.4		

*Students were not included in this category.

The preceeding chart was compiled by Elwood L. Shafer Jr. and James Meitz by sampling at random groups of hikers encountered on wilderness trails in the United States Northeast. David E. Gray, in a dissertation for the University of Southern California, also stated that most hikers were between 24 to 54 years of age.[3] Gray also surveyed the interests and recreational goals of hikers. These are shown in the following chart.

FOREST RECREATION INTERESTS OF HIKERS		PRINCIPLE RECREATION ACTIVITY FOR HIKERS[4]	
Camping	92%	Camping	14%
Picnic	75%	Fishing	14%
Fishing	58%	Hiking	53%
Nature Study	53%	Water Sports	3%
Water Sports	42%	Other	16%
Skiing	17%		
Snow Sports	11%		
Hunting	6%		
Horseback Riding	3%		

Gray included a table in his dissertation pertaining to the length of time of a hiker's trip.

AVERAGE LENGTH OF STAY OF HIKERS[5]	
1 day	6%
2-3 days	19%
4-6 days	22%
1 week	25%
1 week+	28%

This table is based on wilderness hikers who came to the area specifically to hike. However, near parks or population centers forest areas and trails are used much more heavily for short trips and nature walks mostly one day or less in length.[6]

Hikes can be loosely categorized into three groups for the purpose of defining their requirements in terms of length of trail and access. The categories are not meant to define the people who take these hikes, but merely to suggest their needs as determined by the lengths of their trips.

1) The One Day Hike

The one day hike requires a loop trail approximately 2 to 5 miles in length. It can be a winding and indirect route. The trail should embrace various points of interest and return to the starting point (where car is parked).

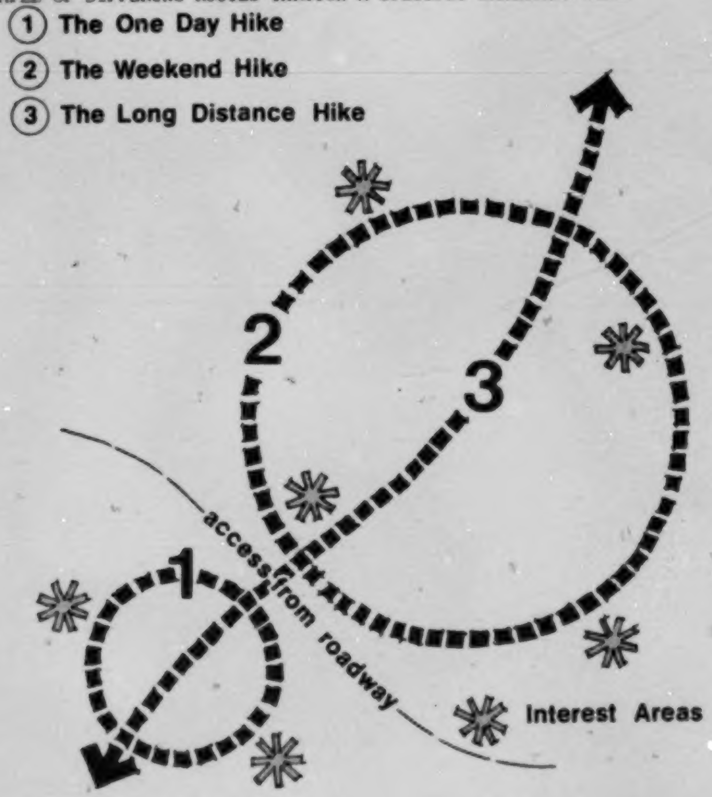
2) "Weekend" or Two-Three Day Hike

The longer stay requires a longer trail of approximately 10-15 miles. Usually, the trail should return to its starting place. However, this is not an absolute; the trail could be linear. The trail need not be a direct route, but should cover more than one geographic environment. Again, different points of interest should be encountered. Facilities or areas for overnight camping are important.

3) The Long Distance Hike

The trail should be linear and relatively direct. Points of interest are still important, but each area the trail passes through need not be thoroughly exploited. Variety in overall environment is more important. Overnight camping areas, water supply, and trash disposal are important considerations.

EXAMPLE OF DIFFERING ROUTES THROUGH A SPECIFIC IMAGINARY AREA



THE HIKING EXPERIENCE

PURITY OF ENVIRONMENT

Studies show that the hiker desires to get away from the trappings of civilization. He seeks a simple trail without fancy "civilized" facilities. He seeks "peace" of time uninterrupted by "urban noise."

Shafer and Meitz's studies on hiker values proved aesthetic and emotional experiences as the more important values to the hiker. Physical experience was half as important, and educational and social values attained an even lesser degree of importance than the physical value. "The relationship to the natural world is more an aesthetic, emotional or romantic link than an educational, intellectual relationship, although these were also important."[7]

VARIETY OF EXPERIENCE

Trails should provide a variety of enjoyable scenic experiences. Variation in landscape or scenery is an important element, as is the emotional value of wildlife sighted in the thicket, the sound of falling water, or the anticipation of what is beyond the next bend. Variety in vegetation or water, views and vistas point to an enjoyable aesthetic experience.

Since physical experience is also of importance, trails should intermingle paths which require little exertion with more difficult paths of steeper grade that challenge one's physical capabilities.*

Hikers suggested that trails should:

> Include large rock outcrops where hikers can observe the surrounding landscape; go through natural openings in forest stands where there is variability in lighting, color, temperature, and the distance one can see through the forest; follow stream courses wherever possible so that waterfalls and rushing water are part of the natural beauty along the trail.[8]

TRAIL USE

The trail environment and the hiking experience are both very valuable and fragile commodities. Trails need to be further developed and at the same time carefully protected.

In areas where primitive foot trails, like the Appalachian Trail, are being exploited by short-term users, erosion, wear, and litter can quickly destroy the wilderness experience. In these areas attention should be focused on other trails to lessen the burden on wilderness trails. On the other hand, in areas where hiking trails and opportunities are few, wilderness trails may need to be made more available to more, and different, hikers.

---

*See note #1, in Appendix B.

There exists a delicate balance between making the most of a trail as a hiking opportunity and overusing it. Overuse may destroy the natural environment, which is so essential to that hiking experience.

Another problem for the hiker is that he often has to share his trail with people who have a different idea about what constitutes a good trail experience. Snowmobiles, motorcycles, ATVs, horses, and bicycles are frequently ridden on the hiking trail; they all detract from the quality of the hiking experience in varying degrees.[9] Horses and bicycles are the least objectionable, and they can be tolerated if trails for their specific use cannot be provided.

Motorcycles and other motorized vehicles do a much greater damage to both the trail and the hiking experience. The sounds and odors created by the vehicles frighten wildlife, and destroy the solitude and wilderness feeling of the trail. These and the erosion and wear caused is intolerable. They should not be allowed on wilderness hiking trails. Snowmobiles are used in the winter, when hiking is at a minimum, and may not cause much conflict with hikers. Although their effect on wildlife cannot be ignored, and that alone could be reason enough to bar them from wilderness trails. In all these cases the individual trail, and the recreational needs of the people must be evaluated before any judgement can be made.*

SUMMARY

People today are doing more and more hiking, and backpacking for recreation, and to escape civilization and return to nature. There is, therefore, an increasing need for development of new trails, and for the expansion and preservation of existing ones. The needs and wants of the hiker, and the conditions necessary to assure a valuable hiking experience must be kept in mind as a basis for any policy of management, design, or improvement of hiking trails.

*See Note #2, Appendix B.

Strategy

APPALACHIAN TRAIL CONSERVATION STRATEGY

The Federal Government Role

As early as 1938, the Federal Government, including the National Park Service and the U. S. Forest Service, entered into Memoranda of Agreement with the Appalachian Trail Conference and the states through which the Trail passes. These Agreements provided for protection of the trail, but such protection was largely confined to the portions of the trail already on public land. By the late 1950's encroachments on the private portions of the trail, including roads, timbering, and development were increasing. In some sections, the threat seemed great enough that maintaining the Trail as a continuous route from Maine to Georgia might become impracticable.

In response to this crisis, in 1968, Congress passed the National Trails System Act, P. L. 90-543, which provided for a nationwide system of trails and initially designated the Appalachian Trail as a National Scenic Trail. Under the Federal Act, the administration of the Appalachian Trail was delegated to the National Park Service, Department of the Interior, in cooperation with the U. S. Forest Service, Department of Agriculture. Subsequently, new Memorandum of Agreement with the states replaced the early Agreements.

Despite the passage of the National Trails System Act, the Federal Government did not immediately take an active role in protecting the threatened sections of the Trail, largely because of a lack of funding. The present Federal strategy is to encourage the States to take an active role in acquisition of critical sections of the Trail and to retain management authority at the State level. The National Park Service believes that the States are best equipped to acquire and maintain the Appalachian Trail land. There appears to be a new attitude developing in the National Park Service, however; the Federal government may have to play a future stronger role in those states which are finding it politically and financially impossible to protect the Trail.

Even if no funds are available for acquisition by the Federal government, still certain Federal actions can be taken which will contribute to the protection of the Appalachian Trail. First, Federally undertaken or funded activities which would have negative impacts on the Trail can be restricted. Such activities might include highways, military installations or airports, dams, power plants, or sewage treatment plants,among others. Second, through other Federal programs, financial and technical assistance for planning and acquisition can be provided to other levels of government. Applicable programs might include those of the Department of Housing and Urban Development, the Environmental Protection Agency, the Bureau of Outdoor Recreation (Interior), and others.

The State Government Role

Pennsylvania is, at this writing, the only state without a state law to protect the Appalachian Trail. In Pennsylvania, only 50% of the Trail lies on public lands, and there is growing pressure for development on the privately owned portions. The Pennsylvania strategy for protection of these endangered areas includes the eventual passage of a State Appalachian Trail Bill with sufficient funding to buy the most critical portions of the Trail. (House Bill #3 and Senate Bill #133 are currently pending before the Legislature.)

However, probably neither a State nor Federal acquisition program would be sufficient to protect all the private sections of the Appalachian Trail, for two reasons. First is lack of money. It has been recently estimated that, in Pennsylvania alone, it would require between $5 and $10 million dollars to buy the remaining private portions of the Trail, with sufficient adjacent land to provide a protective buffer from encroachment and to preserve the scenic and natural character of the Trail environment. It is unlikely that this amount of money would be appropriated by either the Congress or the Pennsylvania General Assembly soon enough to save all sections of the trail before development occurs.

Second, the Federal Act restricted acquisition of land by condemnation to 25 acres per mile of the Appalachian Trail. This amount of land would secure a strip of land averaging only about 200 feet wide. In many areas, 100 feet on either side of the Trail would not provide a sufficient buffer to protect the Trail from environmental, visual, or acoustic intrusion. Thus, even if there were enough money to buy enough land to protect the Trail, there is a legal restriction on the Federal government to use their powers of condemnation to do so. It is likely that a Pennsylvania Appalachian Trail Act would have a similar restriction.

Like the Federal government, State government can take certain actions to assist local government to protect the Appalachian Trail. State officials can contribute advice, technical assistance, and sometimes money, for planning studies. State grants can be used by local government for land acquisition for recreation and open space.

In addition, the State can restrict its activities on State-owned lands, as well as State-funded projects, that would produce negative impacts on the Trail. The State can also review large-scale projects to insure that they are compatible with the Appalachian Trail.

The Local Government Role

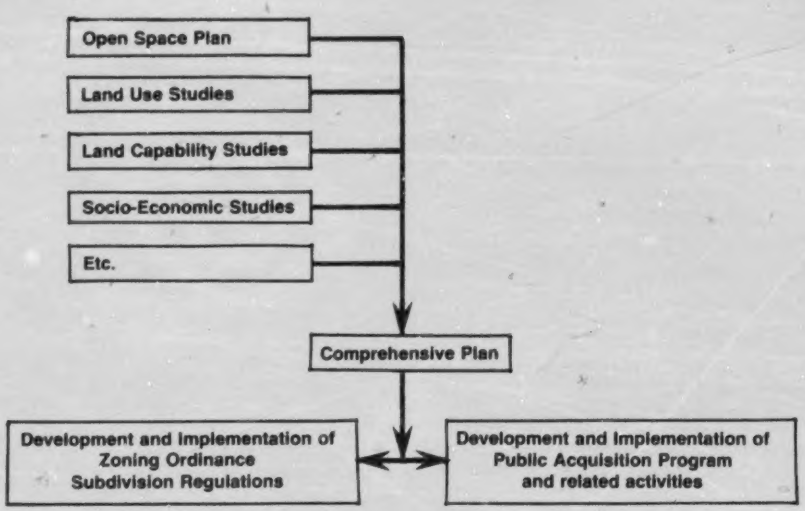
Local governments exercise the major control over land uses in Pennsylvania; therefore, the future of the Appalachian Trail rests to a great extent on their shoulders. Some development has already taken place along sections of the Trail in Pennsylvania, and this curtailed hiking in those areas until alternate routes were found. Other development has and will continue to take place in the corridor and will have an effect on the experience. Government involvement must occur if hiking is to continue as it has in the past on the Trail.

As suggested previously, the Appalachian Trail actually consists of two separate physical components--the footpath and the corridor. The footpath is the actual area that is walked on when hiking, while the corridor is the adjacent land, of an undefined width, which is considered part of the Appalachian Trail and which affects the recreation experiences along the Trail. If hiking is to continue, the footpath must be conserved and open to the public. One goal, then, is to obtain public control over the land use on the footpath, possibly through outright governmental ownership or through agreements, such as easements, with the private landowners. The corridor is somewhat less critical in that even if development occurs there, hiking may continue, although the degree of enjoyment and the type of experience would certainly be different in that situation from one where the corridor is maintained in its natural character. A second goal is to influence land use in the corridor--not to control the land use, but influence it. This might be done through acquisition, agreements, or various other land use controls. Trail users and the general public should recognize that in an urban society there will be some instances where only the footpath exists. In some cases there will be no pleasant adjacent corridor, but only a footpath to get the traveler from one pleasant place to another.

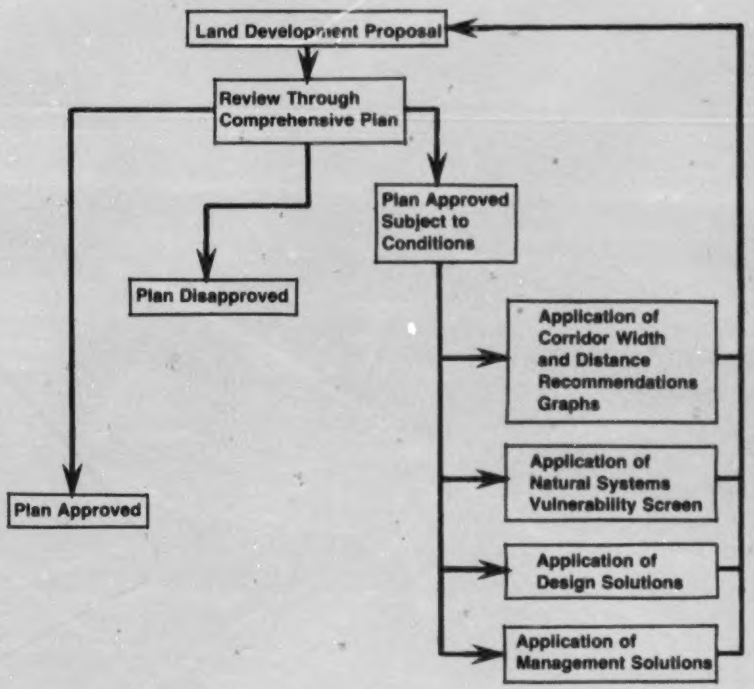
There are two stages at which local governments can influence use of lands on or adjacent to the Trail, as illustrated by the material below.

SUGGESTED TRAIL PROTECTION STRATEGY ROLE FOR LOCAL GOVERNMENTS

I. Strategy Prior to Land Development Proposal


Open Space Plan
Land Use Studies
Land Capability Studies
Socio-Economic Studies
Etc.
Comprehensive Plan
Development and Implementation of Zoning Ordinance Subdivision Regulations
Development and Implementation of Public Acquisition Program and related activities

II. Strategy In Response To Land Development Proposals


Land Development Proposal
Review Through Comprehensive Plan
Plan Approved Subject to Conditions
Plan Disapproved
Application of Corridor Width and Distance Recommendations Graphs
Application of Natural Systems Vulnerability Screen
Plan Approved
Application of Design Solutions
Application of Management Solutions

I. Strategy Prior to Land Development Proposal

Steps for Communities Interested in Conserving the Trail.

Communities interested in conserving the Trail should develop a plan of action detailing how they intend to accomplish that. Such a plan might include the following:

(1) Communities should have comprehensive plans, parts of which address the concern for recreation and open space.
(2) Communities should also have detailed recreation, conservation, and open space plans, parts of which should address the Trail as it relates to each municipality.
(3) Maps should be developed to show the exact location of the Trail.
(4) An inventory should be taken of the environmentally sensitive areas and other natural characteristics in areas immediately adjacent to the Trail. This material will be used to help determine the size of the Trail corridor, locations of use and access areas, etc.

(5) A review should be made of the existing ordinances and subdivision regulations to determine which related concerns are already covered, how well these tools have worked, what if any revisions might be necessary, and to determine what else should be developed.

(6) A determination should be made of the areas in which land or certain land rights will be acquired and their priority, which areas are most appropriate for control through ordinances and subdivision regulations, and the implementation should begin.

Careful work in this pre-development phase can limit the amount of "crisis management" encountered in the development phase. Hopefully, local governments will be able to schedule their municipal priorities in such a way that they can make use of the appropriate land use controls, discussed later, prior to development.

II. Strategy in Response to Land Development Proposals

The development phase consists of the last three steps previously described. The development proposal is compared to. the comprehensive plan and open space/recreation plan. Through this and application of the corridor width and distance recommendation graphs and the natural systems vulnerability screen, certain design and management solutions are determined. The solutions may require: redesign of the development proposals; devotion of land by the developers to trail and recreation uses as specified by local governments; donations of land; public acquisition of land or certain land rights, etc. Or, these solutions may mean that land adjacent to and including the trail must be managed, either privately or publicly, in a certain manner. A further discussion of some of this material follows shortly.

Land Ownership/Control

Prior to discussing individual conservation techniques appropriate for controlling or influencing land use along the Trail, a few thoughts regarding land ownership are in order.

The title to property actually consists of a bundle of rights, e.g. the right to permit public access, the right to remove trees and other vegetation, the right to dump garbage and other materials, the right to development, etc. The owner of a parcel of land, the title holder, may sell these pieces of the title, rights as they are referred to, to other parties while still maintaining legal title for himself. Local governments should give due consideration to acquiring a limited number of property rights, only those necessary to achieve the desired control, such as those mentioned above. Further, within limits, local governments may control, through zoning and subdivision regulations, certain aspects of these rights and the ways in which landowners exercise them.

Fee simple acquisition, acquiring title to the land and all the land rights, may be appropriate in certain instances--for portions of the footpath, for access areas to the Trail, and for recreation use areas along the Trail. However, holding full title does have its costs--it's expensive, and so it shouldn't be used when not necessary, and full ownership brings with it the responsibility for maintenance and liability.

Presently, counties, cities, boroughs, villages, and townships have the power to zone. Under the existing law, Federal and State, zoning can be used to restrict land uses along the Trail which would have adverse impacts. However, the zoning efforts will not open the land to public use; the landowners permission must be obtained for that. Zoning may in certain instances be appropriate for influencing land use in the corridor, but this tool will not be of value on the actual footpath.

As local government officials consider the possible uses of zoning, they should keep in mind that frequently zoning has in effect, been a temporary measure because local officials have permitted numerous exceptions. If that pattern continues, then zoning must be viewed as only a stop-gap measure.

Conservation Techniques

Zoning

Following are described several types of zoning which might be used to conserve the Trail.

Conservation District Zoning is one type with which many local governments are familiar. In the case of the Appalachian Trail, a "Trail District" might be developed. Typically, the Trail District might permit:

1. Outdoor recreation areas such as parks, playgrounds, or picnic grounds.
2. Animal grazing land.
3. Tree nurseries.
4. Commercial forests.
5. Environmental education uses, etc.

Criteria might be developed to permit residential uses on a larger than normal lot size.

Agricultural Zoning is used to restrict land uses to agricultural purposes, and is frequently applied to areas already devoted to that. In many cases, agricultural uses are compatable with activities occurring along the Trail, so agricultural zoning of adjacent lands is one measure to be considered.

Cluster Zoning permits the developer to vary development density on various portions of his land while maintaining the overall, average density as specified by the local ordinance. The developer would concentrate the development on the best suited sections of parcel, while keeping the remaining land in open space. In the case of the Trail, the development would hopefully be removed from the Trail and the Trail would be kept as open space.

Under a Planned Residential Development Zoning Ordinance, developers exercise considerable flexibility in determining how a parcel of land should be developed. Traditional rigid requirements for such things as minimum lot size, setback, and layout design are relaxed and replaced by broad general criteria for overall density, water supply, sewage disposal, etc. Like cluster zoning, the intent is to give the developers a chance to site development on areas of parcels best suited to it while keeping a large portion in open space. Through such an ordinance, development of land adjacent to the Trail can proceed while maintaining the Trail in a relatively natural setting.

Performance Zoning, rather than permitting only certain kinds of development in a specified district, establishes quantative and qualitative standards by which the acceptability of various kinds of development can be determined. For example, a performance zoning ordinance rather than restricting land to only farming, might state that many more uses could take place as long as no more than X percent of the rainfall be permitted to run off the site or no more than Y amount of soil is lost through erosion each year. This has various implications for land near the Trail.

Subdivision Regulations

Local government in Pennsylvania has the power to approve proposed subdivision plat plans by enacting subdivision and land development ordinances. In enacting such an ordinance, a township or borough may specify that the design and development of all subdivisions shall be required to preserve, to the greatest extent possible, all natural, scenic, historic, and aesthetic features. Included among such features would be the Appalachian Trail and the view from it.

As provisions of a Subdivision Ordinance, a municipality may include any or all of the following:

1. The location of the Appalachian Trail as well as other features must be shown on the plat plan.
2. Setbacks of buildings and structures from the Trail may be specified.
3. The regulations may require the dedication of land to open space/recreation, and donation to the local government, homeowner's association, or specify that such areas are to be held by the developer. These areas might include the Trail.
4. The regulations may require that the Trail be controlled by an easement held by the local government, and that this be so stated on the plat plan.
5. Road crossings of the Trail may be limited.
6. The changing of contours and the removal of vegetation in the vicinity of the Trail may be limited or prohibited.
7. The developer may be required to prepare an impact statement showing the measures he has taken to protect the Trail, and other natural, scenic, historic, and aesthetic features.

Acquisition

Aside from the above, there are several options local governments might use in terms of either acquiring the land, controlling the rights along the Trail, or influencing land use.

Acquisition of The Full Land Title

From strictly the standpoint of actually physically controlling the uses which occur on the Trail, outright acquisition of the full title to the land might seem to be the ideal. However, local governments do not now nor will they likely ever have enough money to acquire all the trail and the necessary adjacent land. The goal is to keep the Trail open for public use and the adjacent land in a relatively natural condition. As long as some kind of arrangement can be worked out with the private owners to see that this is the case, the only apparent need for public ownership would be at active use areas and access points.

Easements

One alternative to outright acquisition is for a public or private group to acquire from the landowner certain land rights relating to the Trail. Examples would include the right of public access, the right to cut trees, to dump trash, etc. Under such an arrangement, the landowners would continue to "physically own" the land, while controlling fewer aspects of it. Under an easement agreement, landowners might or might not be responsible for maintenance and liability, depending on the agreement reached, and in many cases will continue using their land as they had prior to the agreement. Owners may be monitarily compensated for the easement and may be eligible for deductions on local, state, and federal taxes.

Sale and Leaseback or Life Estates

A local government seeking to acquire land will in some instances find owners who, while interested in seeing their land used for public purposes, wish to continue living there for the rest of their lives. Particularly when these owners are getting older, a life estate or sale and leaseback arrangement may be in order. Through such a deal, the local government obtains a guarantee of eventual ownership of the land upon the death of the owners or if they move from that location. Further, public use of at least part of the land immediately is a possibility. The landowners benefit in that they may be relieved of certain tax responsibilities, and part of the maintenance and liability concerns may be assumed by the local government.

Donations

The State and Federal tax laws are such that they encourage donations of personal and real property by permitting deductions on income, estate, gift, and other taxes essentially equal to the value of the donations.

Transfer of Development Rights

Ownership of land is in reality ownership of a "bundle" of rights including the right of development. This development right can be severed from the other rights of ownership and transferred for a valuable consideration. The development rights on one parcel of land (the "transferring parcel") may be transferred to and used upon another parcel (the "receiving parcel"). The development rights may be transferred to a governmental body which can then further transfer them to purchasers. The transfer of development rights concept is within the framework of zoning which would permit such transfer to increase density to a designated maximum in developable areas remote from the Trail. The transferring parcel, through which the Trail passes, would thus remain undeveloped and its owner would more than likely be amenable to continued use of the Trail by hikers or to transferring the land to a governmental body.

Tax Assessment

Act 515 of 1966 enables counties to enter in covenants with landowners to keep land in open space and similar uses. The essence of such a covenant is that if the land in question remains in use for the specified purposes for a given number of years, the tax assessment for that period will be based on those uses rather than on its potential development value. This provides an economic incentive to the owner to keep the land open, and the Trail would seemingly be a permissible use.

Act 319 of 1974 provides that, upon application by the landowner, the value of the land, based on its agriculture or forestry use, will be determined. Land eligible for relief includes agriculture reserve and forest reserve. Agriculture reserve has a minimum acreage requirement while the latter must have 10 acres minimum and agriculture reserve must be non-commercial open space land use for outdoor recreation or the enjoyment of scenic and natural beauty and open to the public for such use without charge or fee. Forest reserve land must be stocked by trees of a size capable of producing timber or other wood products.

Both these acts would only preserve land until such time as development pressure make it economically feasible to withdraw the land for more profitable uses. These acts, like zoning, are temporary measures at best.

The above list of conservation techniques is by no means comprehensive, and local governments should obtain additional information.

Communities might want to contact other municipalities through which the Trail passes to determine what actions they are taking to conserve it. As examples:

- Buckingham Township, Bucks County, while not located along the Trail, is using several land control mechanisms of interest: performance zoning, planned residential development zoning, and transfer of development rights.
- Moore Township, Northampton County has included The Appalachian Trail, and specified corridor widths, in their Official Map.

Private Organizations

Listed last here only for organizational purposes is the Appalachian Trail Conference and its various chapters. For many years, this private group has taken a large portion of the responsibility for the Trail with little help from governmental agencies. The local clubs have publicized the importance and character of the trail to the citizenry and governmental bodies, have obtained use of the Trail through negotiations and agreements with private landowners, have identified and mapped the exact location of the Trail and alternate routes, and have maintained the Trail.

While not meant as a comprehensive listing, following are a few examples of things the clubs can do:

-Assist in the development and promotion of necessary legislation.
-Help with mapping the Trail and alternate routes through their jurisdictions.
-Determine ownership and land use patterns.
-Identify areas of natural character and critical concerns.
-Identify standards for Trail character, related development, etc.
-Help develop a comprehensive plan for the Trail.
-Identify priorities for acquisition and use agreements.
-Assist where feasible with land negotiations.
-Assist with Trail maintenance.

Conservation and Open Space

There is an urgent need for counties, municipalities, and townships to develop adequate conservation and open-space plans covering their areas of jurisdiction. These plans are also necessary to protect the natural landscape quality of an area. The protection provided by these plans might help to preserve the natural vegetation, wildlife, water quality, and air that is so important in maintaining a proper balance between nature and the increasing urbanization of many parts of the country.

"People have a right to clean air, pure water, and to the preservation of the natural, scenic, historic, and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."[9] The Pennsylvania Environmental Quality Board, established first in a series of actions which will lead to the eventual adoption of an environmental master plan for the Commonwealth, stated as one of its goals that steps should be taken in order to protect the natural processes and ecological relationships of man's life support system, and manage the activities necessary to preserve natural, scenic, and aesthetic values of the environment while meeting society's needs, i.e., protection of the Appalachian Trail.[10]

Conservation and open space plans should seek to protect land that is extremely susceptable to being put out of ecological balance by the impact of man-made change. For instance, an area that is forrested on a steep slope may, if timbered, lead to excessive erosion, water pollution, destruction of wildlife habitats, and the aesthetic quality of that area. Therefore, by removing the vegetative cover other elements of the ecological system are greatly affected.

To establish a framework for an open-space plan it is necessary to identify those areas that are more sensitive to development than others; then, by various methods, protect them from possible development effects. Furthermore, areas that are presently unsuitable for development, with the present state of man's technology, should be protected under this plan. The following is a general list of guidelines that may be considered along with uniquely local conditions that may exist.

1. Is the soil of good agricultural quality; if so, should it be preserved for this use? A large amount of good agricultural land is being lost each year to housing developments, and other land uses that, in time, could have a significant impact on our food sources.

2. Will erosion control, watershed protection and the need of vegetation for oxygen production be diminished by extensive development of the land?

3. Will air pollutants from industry and transportation be discharged into the air in unacceptable amounts?

4. Will the destruction of some wildlife habitats upset the ecological balance so that an overabundance of undesirable animal species may result? This may also hold true for various botanical communities.

5. Will urbanization create problems of water quantity and further result in pollutants being discharged into the water resources that are available?

6. Will structures of commercial and industrial interests, including housing, denude the area of its natural landscape character?

7. Will urbanization destroy or detract from areas of unique vegetation and geological phenomenon that can never be replaced?

8. Will urbanization and subsequent construction of modern structures detract from historical and scenic sites of great beauty and educational value?

9. Will urbanization cause a reworking of the land, thus resulting in the destruction of natural waterways and drainage channels?

10. Will increased development create a hardship in providing adequate open space for purely recreational interests?

The above guidelines are just a few of many that may be considered prior to allowing increased density use of lands. Land is a resource that will never increase. There is adequate land available for development if controlled properly and its uses are well-planned. By developing a conservation and openspace plan, a sub-issue within the plan would be the protection of the Appalachian Trail environmental corridor for those areas it passes through.

Implementation Strategies

As a procedure for protecting the natural environment and Appalachian Trail, through the use of a conservation and open space plan, in the rural areas that possess potential developmental opportunities, there are numerous devices that may be used. This protection may be provided in the form of zoning ordinance based on a regional plan including reservation of natural areas, easements, covenants, and acquisition, either by grants or outright purchase. The first step is a protection priority listing made of the areas already experiencing developmental pressures, but great thought should also be given to predicting future development. It is these latter areas that may be more easily protected if action is instituted now.

Zoning

Through zoning, local governmental agencies may guide the development of their jurisdictions to a degree. They may at the very least determine land uses and zone adjacent lands to uses more compatable with the trail.

Establishing Corridor Widths

Establishing guidelines for trail corridor widths in varied landscape situations was identified by the Appalachian Trail Study Group. These were conceived to be an initial and vital step in an overall trail protection strategy. These guidelines were determined through field studies and research into previously conducted studies. Major considerations were audio and visual analysis, which were combined as determinants of overall corridor width guidelines.

Noise

Noise is defined as sound that is noticeably unpleasant. Moreover, noise when excessive "is detrimental to the physical, mental, and social well being . . ." of the individual.[11] Due to this unwholesome effect, sound/noise was determined to be an important factor in the selection of an appropriate corridor width for the Appalachian Trail.

Various firms and individuals, including Kugler and Galloway[12] and Bold, Beranek and Newman have established recommended noise levels associated with certain land uses. Further, in July of 1971 the city of Chicago enacted into law an ordinance controlling noise levels. Other cities and communities within the United States are now in the process of instituting noise ordinances. The states of California and New York have recently passed noise control legislation and others will undoubtedly follow their lead. Within the ordinances passed, there is general agreement as to recommended noise levels of various land uses. The study group, in determining corridor width, used these recommendations as the maximum acceptable limits.

Maximum Acceptable Noise Levels for Various Land Uses

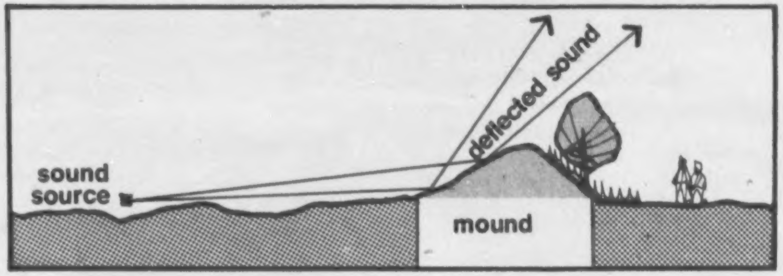
Transportation	90 db(A)
Industrial	86 db(A)
Commercial	76 db(A)
Residential	70 db(A)
Recreational	65 db(A)

All of the decibel levels listed above are excessive to the individual walking in a natural environment. According to two sources, the noise level at which people are likely to complain is 70 db(A).[13] [14] This level is based on the study's definition of peak noise in a residential area. The level of acceptance is 55 db(A) in this same area. An ideal level for a hiker in a natural environment was determined by the study group to be 10 db(A) below this level of acceptance.

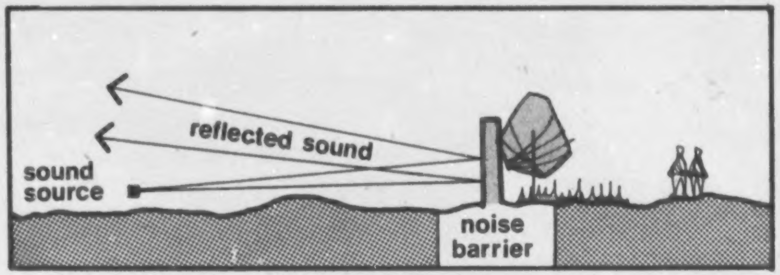
Noise Reduction

The reduction of noise is dependent upon many factors. A few of these factors are: distance from the source, climate, and vegetation. The existence and use of vegetation is the only reasonable variable which may be utilized in the lowering of noise and still having a corridor width of reasonable size. Noise is reduced in three ways:[15]

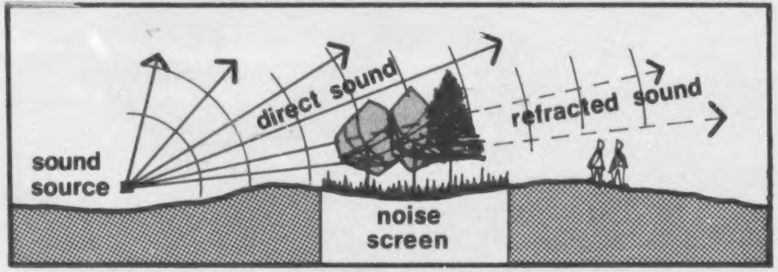
Deflection--by utilizing a barrier to bounce the sound in a direction away from a potential listener.



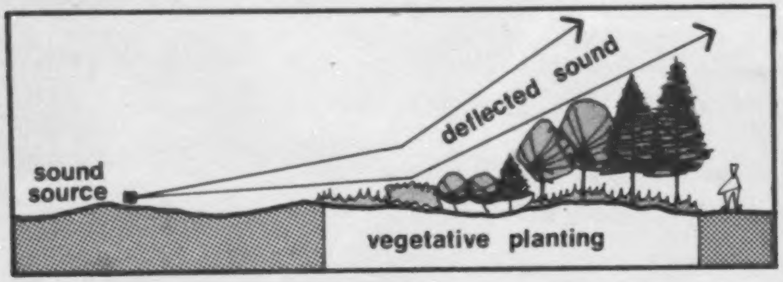
Reflection--by shielding the noise and reflecting it back towards the source.



Refraction--by diffusing and scattering the noise, as would occur if vegetation were used.



Since thick tree bark and dense foliage have the capacity to absorb and/or diffuse and scatter sound waves, their use can be expected to result in increased noise reduction (refraction). Employing this principle, an increase in the depth of plantings increases noise reduction. Additionally, by locating smaller plant materials closer to the noise source and gradually increasing vegetation height away from the sourse, noise may be directed up and over any potential listener (deflection). Reflection cannot be successfully accomplished through the use of vegetation due to penetration of the sound waves.



"Vegetative Plantings Deflecting Sound Waves"

A reduction design value of 5 db(A) per 100 feet of planting may be used if trees are in excess of 15 feet high and sufficiently dense so that the noise source cannot be seen. If however, the noise source is visable through the vegetation a 3 db(A) per 100 feet reduction figure should be used. A 1.5 db(A) per 100 feet reduction figure may be used in an open area based solely on distance and subsequent ground absorption.[16] [17]

The values listed above are general and result from a compilation of results of the previously listed studies. The reduction values vary to some degree with vegetation types; however, it is interesting to note that the distinction between the reduction effects from evergreen and deciduous trees is very slight.

Sight

The distance an individual can see an object or structure within various landscapes was also determined to be an important factor in selecting an appropriate corridor width for the Appalachian Trail.

A field study was conducted by the Study Group in various vegetative settings on two basic landforms, ridgetop-side slope and flat-rolling topography. Broken down, the vegetative groupings fell into seven different categories.*

1. Coniferous growth with understory
2. Coniferous growth without understory
3. Deciduous growth with understory
4. Deciduous growth without understory
5. Mixed coniferous and deciduous growth with understory
6. Mixed coniferous and deciduous growth without understory
7. Open ground

The results of this field study are reported in subsequent graphs along with the results of the noise study enabling the Study Group to determine an acceptable range of width for the trail corridor.

Corridor Width

Upon completion, the audio and visual studies were applied to the trail route to establish: 1) ideal, 2) acceptable, and 3) unacceptable corridor widths.

In reviewing the data collected, the distances related to the audio aspect were substantially greater than those for visual; therefore, the ideal trail corridor width for all land uses was taken from the audio data, the distance at which the noise level would be reduced to 45 db(A). This decibel level provides a quiet background for the wilderness hiker. The distance at which the corridor width is acceptable for each land use was the distance at which the noise is reduced to 55 db(A). The reason for emphasizing the audio aspect was to retain as much of a wilderness experience as possible for the Appalachian Trail Hiker. Even though a hiker may not be able to see a source of noise annoyance, he will not feel a part of the trail environment if he is exposed to loud high-pitched noises.

An exception to the emphasis placed on audio considerations was with respect to recreational land. In analysing the type and level of noise produced by lands in recreational use it was determined that accompanying noise levels would not be offensive to the trail hiker. Recreational lands are utilized seasonally and intermittently. Thus, visual data was used to determine the minimum acceptable corridor width.

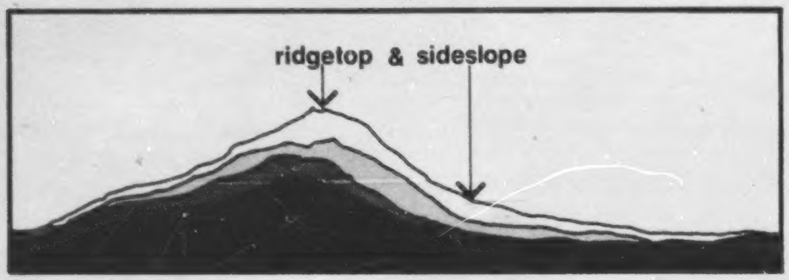
Conclusion

The purpose of these studies, and the resulting determination of corridor widths, is that they may serve as guidelines for municipalities and other land use regulatory agencies in dealing with developers. By breaking each potential problem down into specific land forms, vegetative conditions, and individual land uses, an agency can easily attack the corridor width problem in any given situation. Only a comprehensive analysis and plan can provide substantial assurance of protecting an adequate corridor width for the trail, over the whole length. Hopefully, phases of this report may help local agencies to recognize potential conflicts and provide them with adequate tools to confront and deal with problems before they occur.

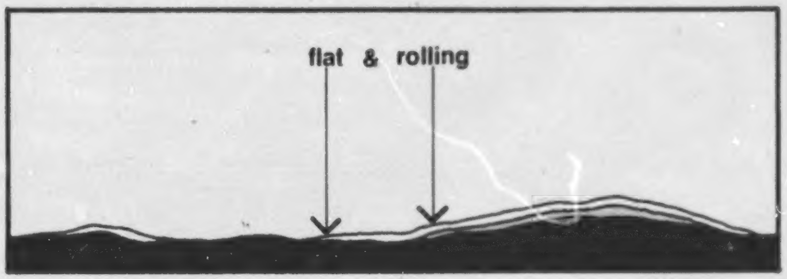
*See Note #3, Appendix B.

How To Use Graphs For Recommended Distances Between Trail And Land Use.

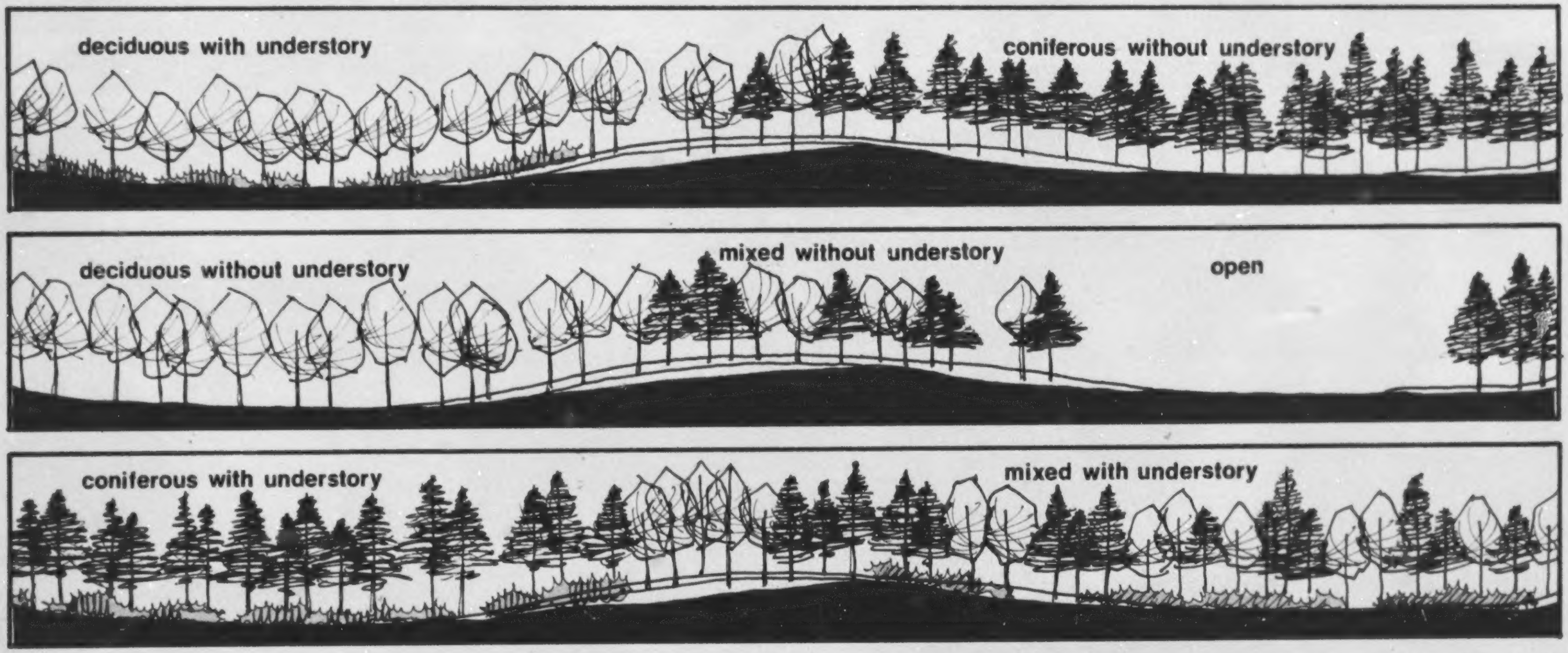
1. Determine Landform


ridgetop & sideslope

or


flat & rolling

2. Determine Vegetative Cover


deciduous with understory
coniferous without understory
deciduous without understory
mixed without understory
open
coniferous with understory
mixed with understory

3. Refer to the appropriate landform/vegetative cover and land use

The charts on the following pages portray the recommended distances between the trail and several selected general land uses in areas with various landform/vegetative covers. Sight and sound, as indicated by the symbols 👁 and 👂 are the sensory determinants the study group considered when establishing the recommended distances.

The distances are broken down into two categories: Acceptable (shown in light type) and ideal minimum (shown in bold type). In order to determine a total corridor width, distance should be established for each side of the trail. If the land use or landform/vegetative cover differs on either side of the trail it will be necessary to establish two separate recommended distances, one for each side of the trail.

The reader will notice that sound, rather than sight, has the greatest impact on the recommended corridor width. However, if a particular land use is uniquely quiet, the recommended minimum distance for sight may be more appropriate.

NOTE: If recreational land use involves motorized vehicles, transportation land use corridor widths should be used.

Recommended Corridor Widths for Various Situations

(Shown in feet)

		Landform/Vegetative Cover						
Land Use		Ridgetop & Sideslope Coniferous With Understory	Ridgetop & Sideslope Coniferous Without Understory	Ridgetop & Sideslope Deciduous With Understory	Ridgetop & Sideslope Deciduous Without Understory	Ridgetop & Sideslope Mixed With Understory	Ridgetop & Sideslope Mixed Without Understory	Ridgetop & Sideslope Open
Transportation	∢	25/40	50/115	30/70	65/145	25/60	65/135	200/500
	👂	675/900	1200/1500	675/900	1200/1500	675/900	1200/1500	2300/3000
Industry	∢	25/40	50/115	30/70	65/145	25/60	65/135	200/500
	👂	600/800	1000/1400	600/800	1000/1400	600/800	1000/1400	2000/2500
Commercial	∢	25/40	50/115	30/70	65/145	25/60	65/135	200/500
	👂	400/600	700/1000	400/600	700/1000	400/600	700/1000	1400/2000
Residential	∢	25/40	50/115	30/70	65/145	25/60	65/135	200/500
	👂	300/500	500/800	300/500	500/800	300/500	500/800	1000/1600
Recreation	∢	25/40	50/115	30/70	65/145	25/60	65/135	200/500
	👂	200/500	500/700	200/400	500/700	200/400	500/700	1100/1300

Recommended Corridor Widths for Various Situations

(Shown in feet)

Land Use		Landform/Vegetative Cover						
		Flat & Rolling Coniferous With Understory	Flat & Rolling Coniferous Without Understory	Flat & Rolling Deciduous With Understory	Flat & Rolling Deciduous Without Understory	Flat & Rolling Mixed With Understory	Flat & Rolling Mixed Without Understory	Flat & Rolling Open
Transportation	∢	25 / 40	90 / 200	30 / 70	200 / 450	25 / 60	90 / 200	200 / 500
	👂	675 / 900	1200 / 1500	675 / 900	1200 / 1500	675 / 900	1200 / 1500	2300 / 3000
Industry	∢	25 / 40	90 / 200	30 / 70	200 / 450	25 / 60	90 / 200	200 / 500
	👂	600 / 800	1000 / 1400	600 / 800	1000 / 1400	600 / 800	1000 / 1400	2000 / 2500
Commercial	∢	25 / 40	90 / 200	30 / 70	200 / 450	25 / 60	90 / 200	200 / 500
	👂	400 / 600	700 / 1000	400 / 600	700 / 1000	400 / 600	700 / 1000	1400 / 2000
Residential	∢	25 / 40	90 / 200	30 / 70	200 / 450	25 / 60	90 / 200	200 / 500
	👂	300 / 500	500 / 800	300 / 500	500 / 800	300 / 500	500 / 800	1000 / 1600
Recreation	∢	25 / 40	90 / 200	30 / 70	200 / 450	25 / 60	90 / 200	200 / 500
	👂	200 / 400	500 / 700	200 / 400	500 / 700	200 / 400	500 / 700	1100 / 1300

Natural Systems Vulnerability Screen

The evaluation of a development proposed in the vicinity of the Appalachian Trail should include, in addition to the corridor width concerns discussed in the previous section, an analysis of the potential impact of the development on the environment in general. The high quality of the environment in or near a recreation area is particularly important for the maximum enjoyment of the area.

The natural systems vulnerability screen is a tool to be used by municipalities to insure the compatibility of a particular land use development plan to its site environment. Development should not occur on unsuitable ecological settings, which comprise major sections of the existing trail corridor. State laws and local ordinances should restrict development in these locations.

The Natural Systems Vulnerability Screen consists of these factors: 1. soil erosion, 2. vegetation, 3. wildlife, 4. visual impact, 5. ground water pollution, 6. surface water pollution, and 7. septic tank suitability plus factors which are a determinant of degree of vulnerability i.e. soils, geology, slope, depth to bedrock, depth to water table, permeability and aquifer recharge zones.

EROSION VULNERABILITY

Soil erosion vulnerability analysis predicts the degree of erosion that is likely to result when the land is stripped of its vegetation during development. The increased runoff caused by the removal of vegetation, especially in areas of fine textured soils, intensifies the likelihood of erosion and flooding.

Factors involved in measuring the degree of vulnerability are rainfall, soil type or stability, and gradient of slope. Rainfall (the erosion causing factor) varies with the local climate. The greater the rainfall, the greater the potential for erosion. Degree of slope and soil stability are plotted against each other to arrive at the level of vulnerability. Slight limitation areas can tolerate most types of development with minimal erosion. Severe limitation areas are not suitable for normal construction, and require sophisticated erosion control measures.

VEGETATION VULNERABILITY

Determining factors of vegetative vulnerabilities are: surface water, slope, vegetative associations, wildlife, and topography. An examination of on site characteristics (i.e. slope, floodplain areas, ridgetop, marshland, deciduous and evergreen stands, and undergrowth) and subsequent rating of these characteristics determine the vulnerability of the vegetation to development. For example, a 60% slope or greater is high in vulnerability because of the consequences involved in development, namely: severe erosion, runoff, and high visual impact. A marsh is an extremely sensitive ecotone for wildlife, therefore, vulnerability is high. Ridgetops have high visual impact, wind exposure, and diversity in wildlife, giving it a high rating. Abuse of highly sensitive or vulnerable stands of vegetation may cause their death. Such destruction lowers the visual quality and the number of wildlife habitats.

WILDLIFE VULNERABILITY

The importance of a wildlife vulnerability analysis is to show: the prime zones in which wildlife exists; and zones which contain the most diversity of species. Wildlife ecosystems and habitats are the two factors considered to determine the degree of vulnerability. Because an area is low in vulnerability it does not imply that development is allowable. For example, one of the least vulnerable areas is a conifer/pine forest, but due to its limited numbers, development could result in wiping out a species from the area. Open agriculture is less vulnerable, and in dealing with large areas, some could be sacrificed for minor construction without significant wildlife losses.

VISUAL IMPACT

Visual impact or quality may serve as a guideline in determining lands which are to be preserved or developed. Visual impact is dependent on landform, vegetation, and unique site character. Ridgetops and gaps rate high in visual quality and high in vulnerability due to the extreme visibility of development in these locations. The visual dominance of the ridgetop makes it one of the most significant elements in a landscape, and therefore especially vulnerable to development. Unique or specimen plantings also have a high visual impact. Site features such as waterfalls and rock outcrops have a special visual impact. Unique visual features should be preserved or enhanced--not overwhelmed by development.

SURFACE WATER POLLUTION VULNERABILITY

Surface water pollution vulnerability indicates potential input of biotic and sediment pollution of surface waters. Biotic pollution is directly or indirectly related to man-made features such as septic tanks, while sediment pollution stems from man altered zones. Sediment pollution or erosion is compounded by steep slopes, impermeable soils, and unstable soils. Sedimentation and siltation occur when soil particles, organic matter, and dissolved nutrients reach surface water features and filter out or deposit. These deposits along with biotic pollution can cause an imbalance in the existing water ecosystem.

GROUND WATER POLLUTION

The factors involved in determining the vulnerability to ground water pollution are slope, soil permeability, depth to water table, and aquifer recharge areas. Septic tank effluent, pesticides, chemical fertilizer used in agriculture, and leachates from solid waste are potential ground water pollutants. The potential for pollution depends on the mobility of the contaminant, and the hydraulic characteristics of the ground water. The ability of the pollutant to leach through the soil depends on the soil permeability. Contaminants leach continuously; therefore, refuse in shallow water table areas has a maximum potential for ground water pollution.

SEPTIC TANK SUITABILITY

Effluent should be disposed so as not to pollute surface or ground water. Pollution can lead to problems affecting not only the environment, but also the economic and health related aspects of the development.

Limiting factors to septic tank suitability are: slope greater than 15%; depth to bedrock of less than 6'; depth to water table of less than 6'; and soil permeability rate faster than 6.3"/hour or slower than 2.0"/hour.

CONCLUSION

The natural systems vulnerabilities are interrelated. Development will most likely affect a series of vulnerabilities rather than a single factor. For example, while land is cleared during construction, loss of vegetation leads to severe erosion, which in turn pollutes a nearby stream with sediment. The vegetative vulnerability contributed to the erosion and pollution vulnerabilities. Differing land uses will involve different impacts, which are summarized in the following table:

LAND USE	VULNERABILITY
RESIDENTIAL	
subdivision	vegetation, visual impact, ground water pollution, surface water pollution, septic tank suitability, soil erosion
private estates	water pollution, septic tank suitability
INDUSTRY	visual impact, ground and surface water pollution, wildlife, septic tank suitability, soil erosion
RECREATION	
camps	water pollution, septic tank suitability
campgrounds	visual impact, water pollution, septic tank suitability
ski area	vegetation, visual impact, wildlife, septic tank suitability, soil erosion
UTILITIES	visual impact, soil erosion
TRANSPORTATION	vegetation, visual impact, wildlife, soil erosion
AGRICULTURE	surface water pollution, ground water pollution, soil erosion

The value of a natural systems inventory is not limited to trail protection; it is invaluable to municipalities in maintaining a balance between open space conservation and development. To this end each community or township is urged to inventory and analyze their natural systems.

Introduction to Design and Management Solutions

Design Solutions

On the following pages are illustrated a few of the many possible design solutions which local governments and developers might consider when development occurs in the vicinity of the Trail. Little discussion of this section is necessary as it is self-explanatory. Further, considerable material has been published on this subject. While not discussed in depth in this section, part of the design solutions may include public acquisition and related conservation activities.

Management Solutions

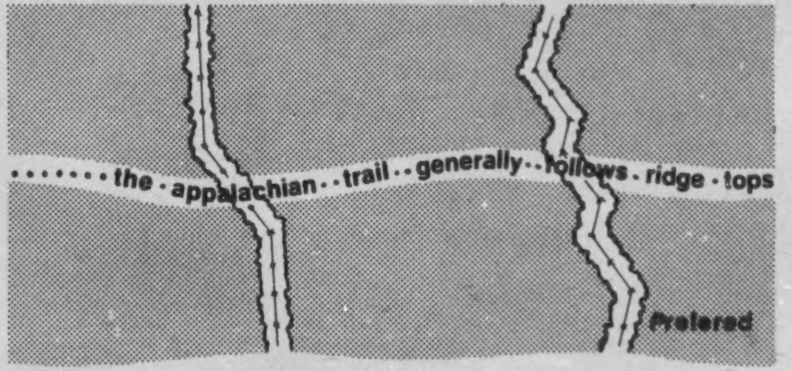
The potential management solutions are as numerous as the number of Pennsylvania local governments impacted by the Trail. These solutions could discuss control of the Trail as it relates to the citizens and government, private landowners, and private trail organizations. These solutions might include, by way of example, agreements which address private ownership of the land while setting forth a framework for public operation and access.

Concerns for the control of trespassing and vehicular use, and the handling of maintenance and liability would be part of such discussions. Maintenance problems would include: how will Trail washouts due to heavy rains or soil erosion caused by overuse be corrected; who will take the responsibility for the cleanup of trash and how often should it be done; how will the clearance of limbs and fallen trees which obstruct the Trail be handled, etc.

p. 24 blank

Transportation

In certain locations, the Appalachian Trail must follow a busy road or highway for a significant distance. Additionally, the trail must cross interstate highways, pass under electric power lines, and over buried pipelines. This area deals with these situations. The design proposals included here reflect a concern that the Trail cross highways or utilities in the most efficient manner. For example, the Trail primarily follows ridgetops from Maine to Georgia. Inevitably, it is going to cross powerlines and pipelines. The solutions presented show how utility companies, working in conjunction with local governmental officials and designers can reduce the visual impact of utilities on the landscape and quickly and safely direct the hiker across utility easement. These solutions may benefit the utility owners while at the same time creating more interesting spaces for the hikers.

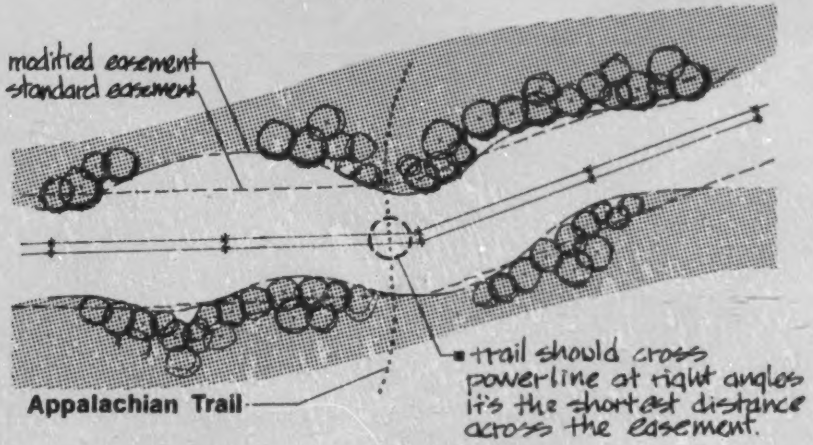

the · appalachian · · trail · · generally · · follows · ridge · tops
Prefered

- **Powerline crossing ridge top**

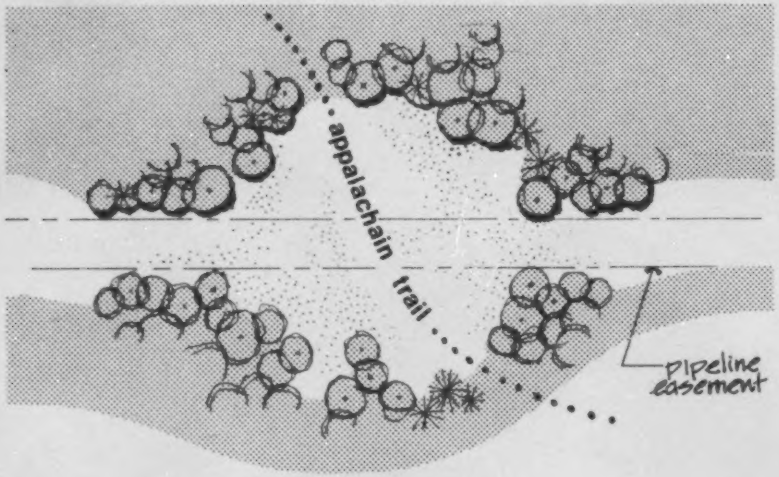
- the visual impact of straight easements over mountains
- can be reduced by angling them as shown above.
- the technique also lessens erosion potential.

- **Trail crossing powerline**

- modify easement line to reduce monotony and create
- a more interesting space.

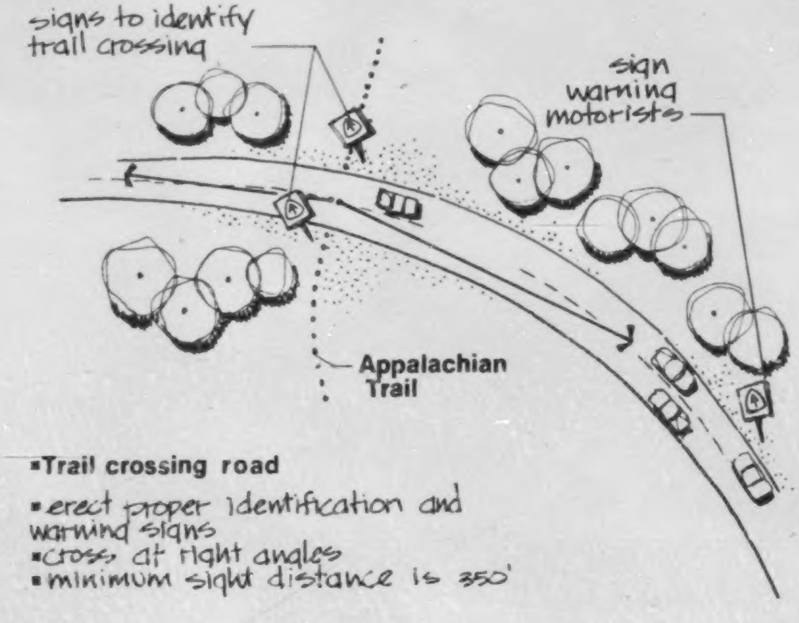


- trail should cross powerline at right angles it's the shortest distance across the easement.


appalachain trail
pipeline easement

- **Trail crossing buried pipeline**

- utility companies could create a meadow at the point the trail crosses a pipeline. this provides some visual diversity for the hiker. perhaps the open space can be planted with indigenous grasses and wild flowers

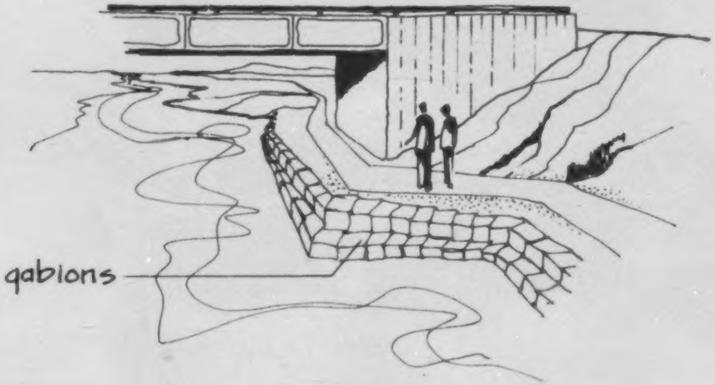

signs to identify trail crossing
sign warning motorists
Appalachian Trail

- **Trail crossing road**

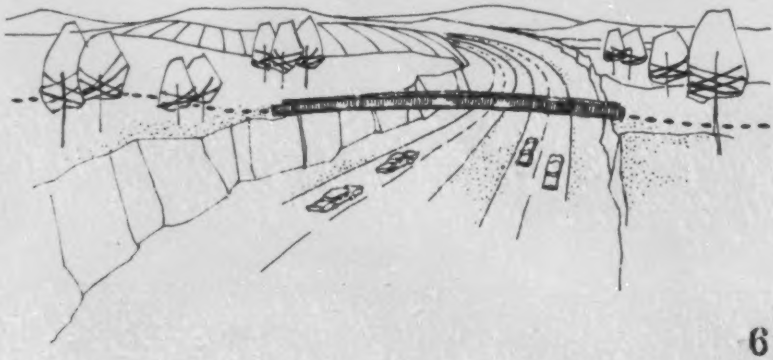
- erect proper identification and warning signs
- cross at right angles
- minimum sight distance is 350'

- **Trail crossing limited access highway**

- **underpass**
- use gabions (stone filled wire containers) to raise ground level out of water



- **overpass (footbridge)**



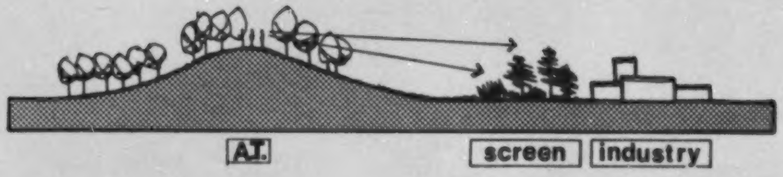
Industrial

Industry is defined as any enterprise in the economic community not engaged in retail sales. Examples include: manufacturing, warehousing, transportation depots and the like.

The design solutions in this portion are primarily applicable to the Cumberland valley, because this region has more existing and potential industry than the other sections. Most sections of the trail in Pennsylvania are located on ridge tops which are usually wooded. Industry located in a valley below is normally distant enough to have no significant impact on the hiking experience. Therefore, no design solutions are included covering this situation.

In being realistic about industrial solutions, one must remenber that we live in an industrial society. If the only alternative for the Appalachian Trail is that it be located very close to or in the middle of industry, we should recognize the industrial setting and not attempt cosmetic solutions. The design solutions presented in this portion are not intended to completely separate industry from the trail. However, they are intended to soften the impact industry may have on the desired character of the trail corridor.

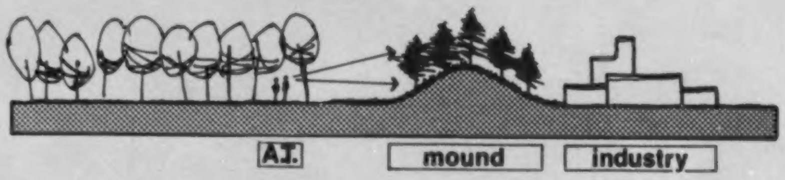
Industry and the Appalachian Trail may co-exist with mutual benefit. For instance, an industry that recognizes the trail and provides a suitable corridor, may improve its image in the community.



■ Planting screen

DISTANCE
PERCEPTION

perception decreases as distance increases. little or no screening is required if the industry is located a significant distance from the trail. however, if the screening is used it should be as close to the object being screened as possible.

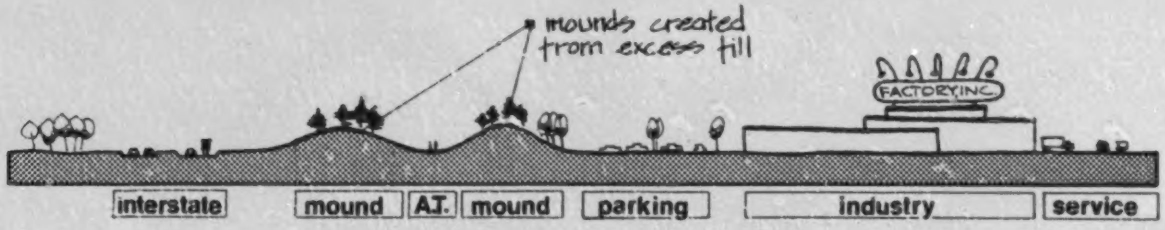


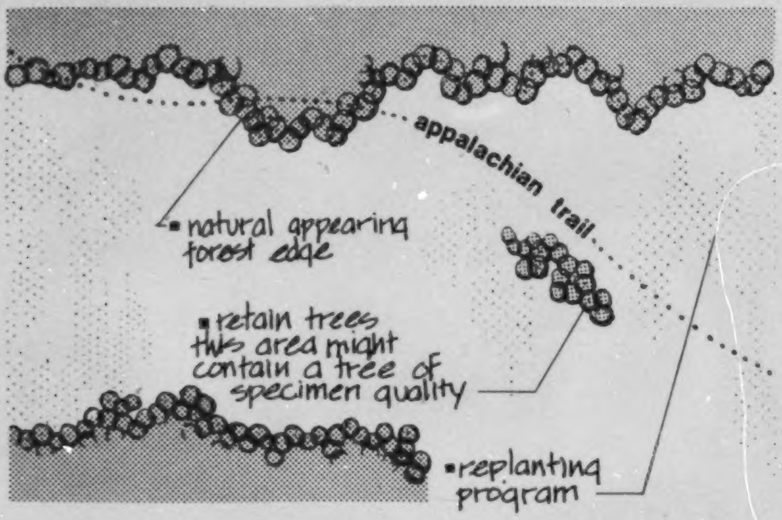
■ Mound & planting screen

in order to create a more effective screen, mounding should be used in addition to vegetation again, the screen should be as close to the offensive object as possible.

■ Excess fill used for mounds

on flat construction sites mounds can be created from excess fill. using the fill in this manner eliminates the cost of removing it from the site

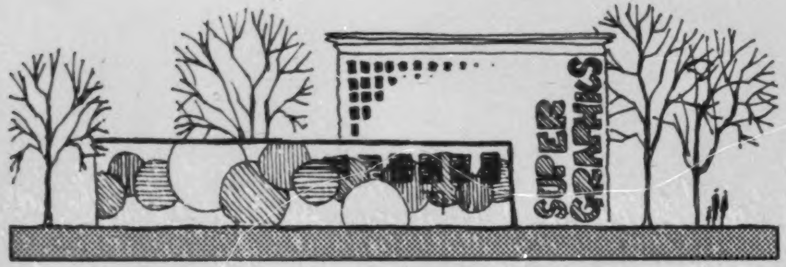



appalachian trail
natural appearing forest edge
retain trees this area might contain a tree of specimen quality
replanting program

Lumbering - clearcutting

extensive clear-cutting is not in the best interest of conservation. however, if this practice is used the visual impact should be considered. suggestions to deal with this include:

- create an irregular or natural appearing forest edge.
- retain selected trees in the clear-cut area.
- replant the clear-cut area.

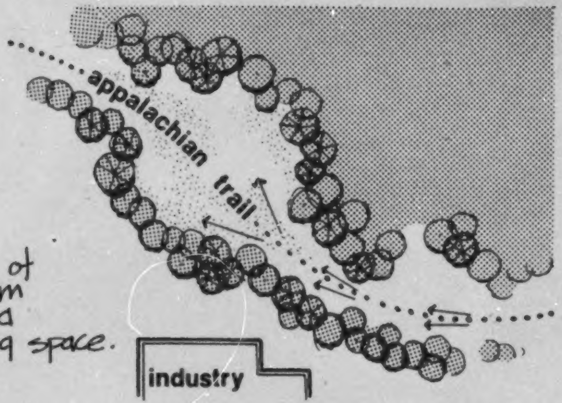

SUPER GRAPHICS

Super graphics

super graphics can reflect the nature of the industry, nature of the trail or be a composition of bright colors. for the economy minded, this could be a civic project.

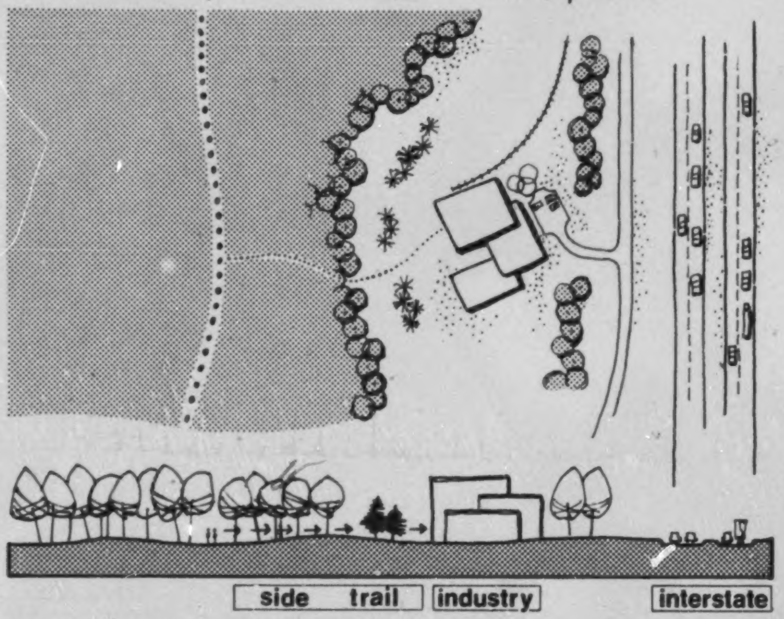
Diversion

direct interest of hiker away from the factory to a more intriguing space.


appalachian trail
industry

Side trails

- encourage industry to be community oriented; set aside acreage for trail environment.
- signage on trail - identify the industry, indicate what facilities are available (restrooms, water, plant tours, etc), and provide a side trail to the building.
- encourage trail clubs to maintain area in return for privilege of using land.
- locate industry downwind from trail if possible


side trail
industry
interstate

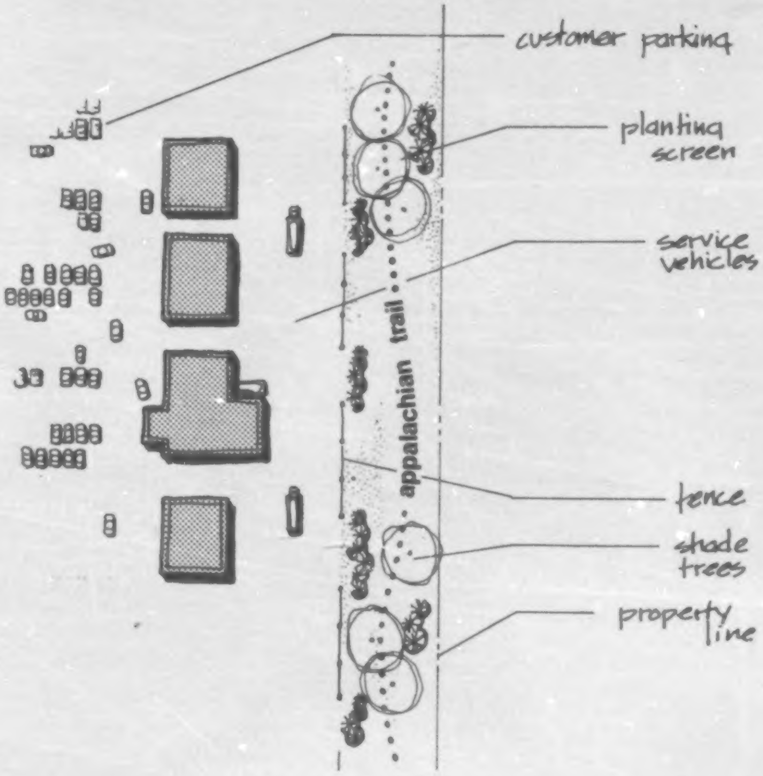
Commercial

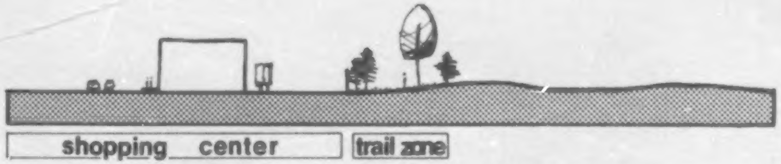
At various locations throughout the state, the Appalachian Trail passes through small towns and along highways with strip commercial development. The commercial design solutions presented here address themselves to these situations.

There are two major problems commercial land uses generate with respect to the trail. First, there is the loss of a wilderness character. If the trail must pass through a commercial development, the character of the trail will be altered. It would be ridiculous to attempt a reconstruction of wilderness. Instead, designers and planners should emphasize suburban character and take advantage of the existing amenities of the area.

Second, there is a major conflict between hikers and vehicles. The Appalachian Trail Conference and its member clubs should coordinate with local businessmen and government agencies in order to establish a well marked trail and keep pedestrian and vehicle conflicts to a minimum. Street furniture and facilities such as trash containers, telephone, lighting, restrooms, may be installed. These amenities benefit residents of communities as well as hikers.

The trail passing through a commercial area does not have to be a detriment to the community or the hiker. On the contrary, businessmen may profit from hikers who need services and supplies commercial entrepreneurs provide.





▪ Shopping center - land set aside for trail

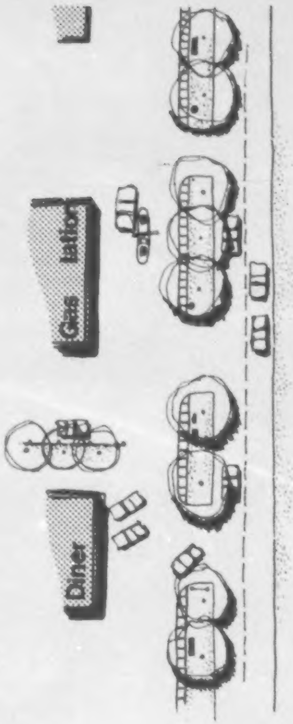
- encourage shopping center developer to set aside a strip of land through which the trail can pass so it does not conflict with shopping center traffic.
- trail should be screened as much as possible from the rear or service side of buildings.
- selective screening where necessary to relieve monotony or block a particularly bad view.
- encourage local trail clubs to plant and maintain the trail zone.

- the trail doubles as a sidewalk

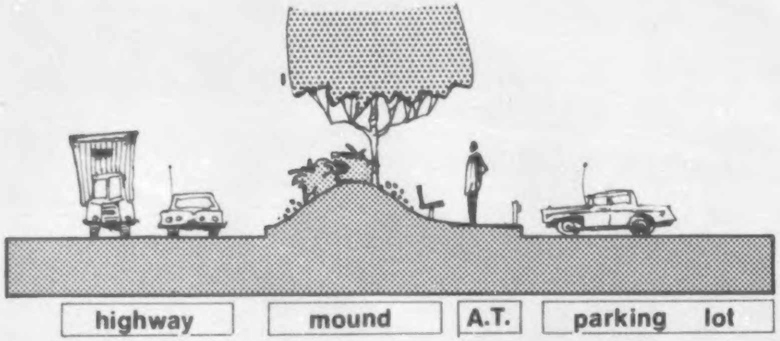
- encourage the municipality to maintain a linear park between the highway and strip development

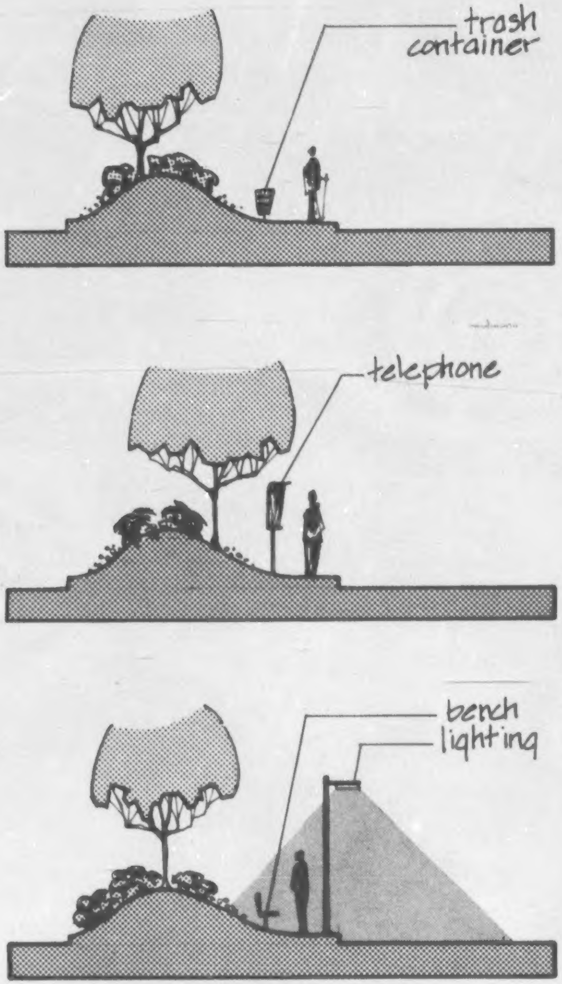
- amenities to be provided should include sidewalks, benches, water fountain, lighting, trash containters, telephone, identification signs, etc.

- mounding is an effective screen to seperate the highway from pedestrians visually and audially. the screen is not meant to obscure the highway 100% but to soften the impact. in addition, the mounds provide a sence of security for the pedestrian.


Gas Station
Diner

- **Strip development - trail parallels highway**


highway
mound
A.T.
parking lot


trash container
telephone
bench
lighting

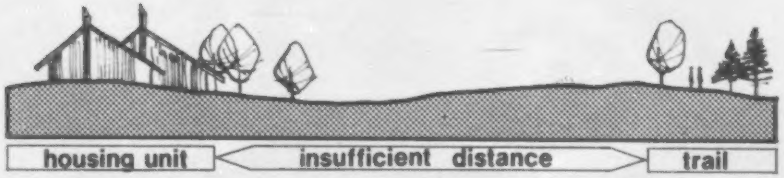
- sections showing various amenities that should be made available to pedestrians in a typical sidewalk situation.

Residential

Residential development can range from a private estate to a large subdivision. The private estate will not greatly detract from the hiking experience if it is appropriately sited because the density (per acre) is very low. Large cleared areas, grading for roads and home sites, and the introduction of utilities are all integral parts of residential development.

Residential development can be divided into two categories: 1. unplanned (strip development), and 2. planned (subdivisions, P.U.D.'s, etc.). The design solutions proposed on the following pages concern themselves with residential development, excepting private estates.

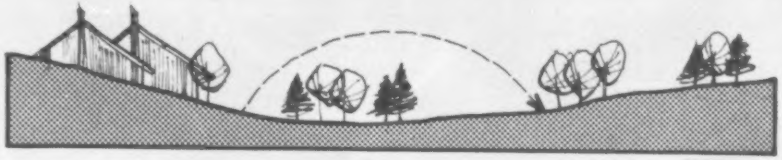
In many locations the Appalachian Trail is receiving pressure from residential developers. People want to get away from urban centers and own land near "wilderness areas;" however, many of these developments occur upon or very near the Trail corridor. If an adequate corridor will not be provided by the developer, other design solutions for the layout of a development should be considered. The solutions presented show how developers can increase the amount of open space available to home owners and trail users at the same time maintaining a density that is economically attractive.



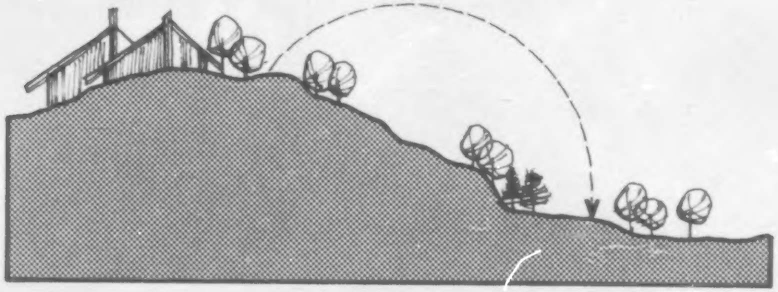
in some situations it might be impossible to establish an adequate corridor width. in this case three basic alternatives should be explored to recreate the wilderness hiking experience.

-Shifting trail to take advantage of existing situations such as landform and vegetation
-Additional planting
-Mounding

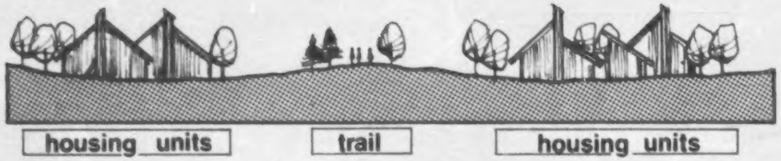
in a shallow valley, moving the trail may help to isolate it.



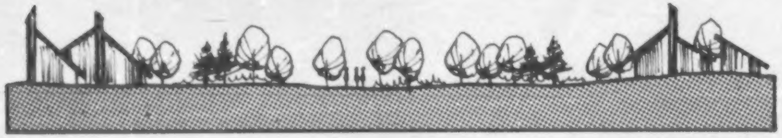
where a steep slope exists, moving the trial as shown will recreate the wilderness hiking experience.



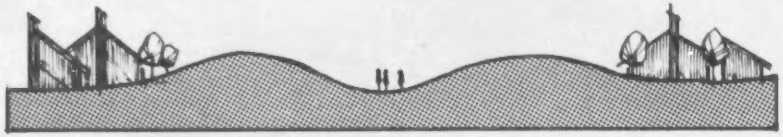
Problem: Housing units introduced close to the trail



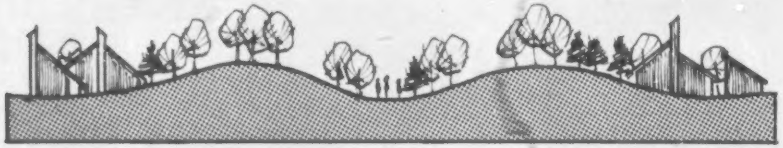
a planting scheme may revitalize wilderness experience.



mounding would be effective where no vegetation exists

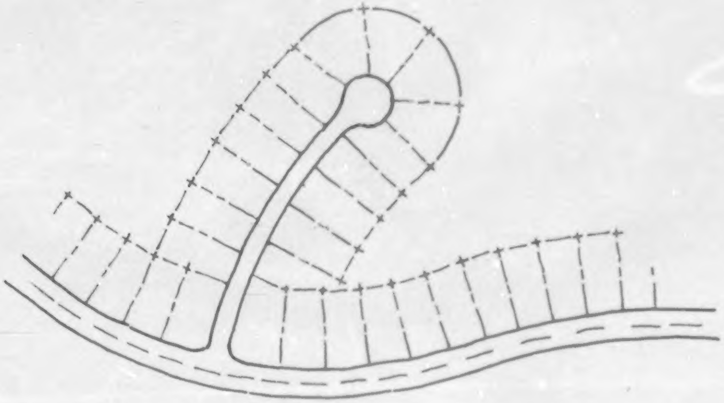


a combination of both would be most effective.



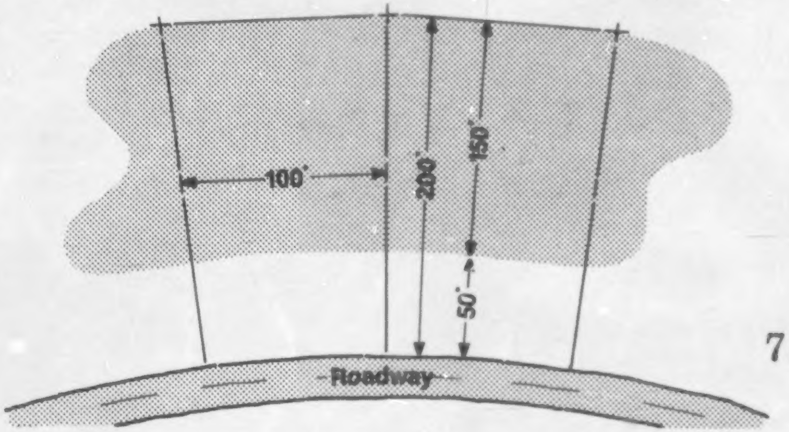
Layout of Lots

by laying out lots in a long thin fashion as shown and then placing the short dimensions to the road the most houses are served by the minimum number roads.



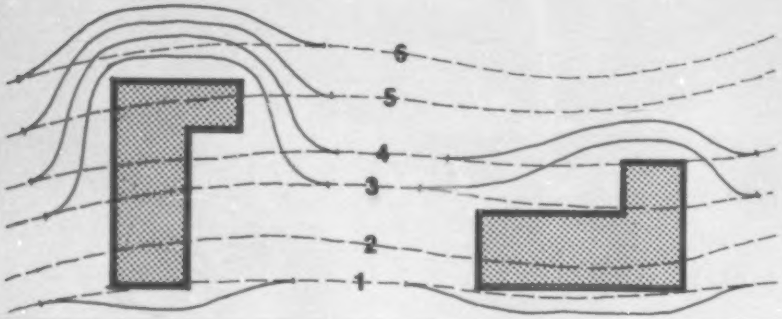
Typical One Half Acre Lots

setbacks for housing units should be from the rear lot line, where the trail will usually be passing. if possible, front setbacks should be minimized and side setbacks abolished. by creating a large backyard that is controlled. the trail experience can be preserved.



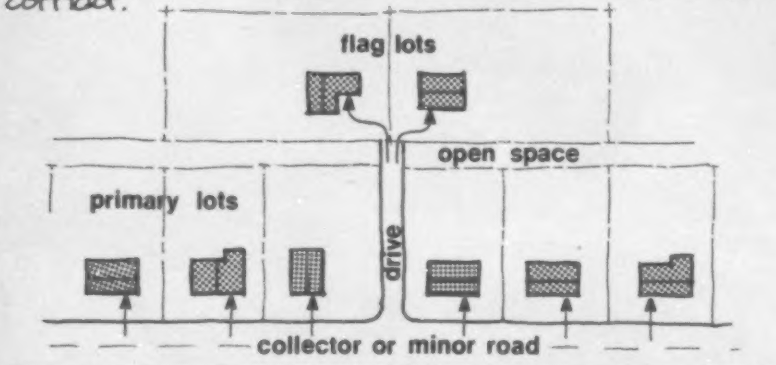
Building Orientation

in the sketch below, the housing unit to the left was placed with it's longest dimension back into the slope of the land. this creates unnecessary cut. the housing unit to the right is placed with the slope of the land to best accomodate it and minimize grading.



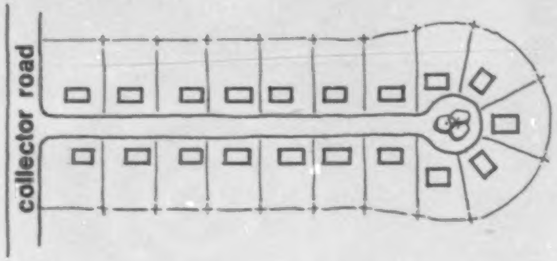
Flag Lots

flag lots are a new concept in cluster housing. basically, they are a concept which conserves road area preserving open space which can be used as a buffer to the trail corridor and as a unifying element in the development. one dual right-of-way driveway is provided for the flag lots. a thin ribbon of land can be used between the primary and flag lots for the open-space corridor.



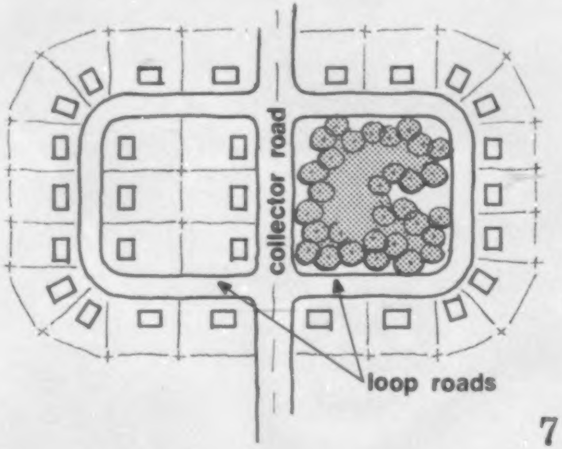
Cul de sacs

cul de sacs have several advantages when used in residential development. more lots can be served with less road area, the road can be made narrower than primary access roads. each cul de sac becomes a neighborhood unit in itself and can easily be adapted to an open space system. land saved from fewer and narrower roads can be used as an integral open space system. existing vegetation should be retained at the center of cul de sac.



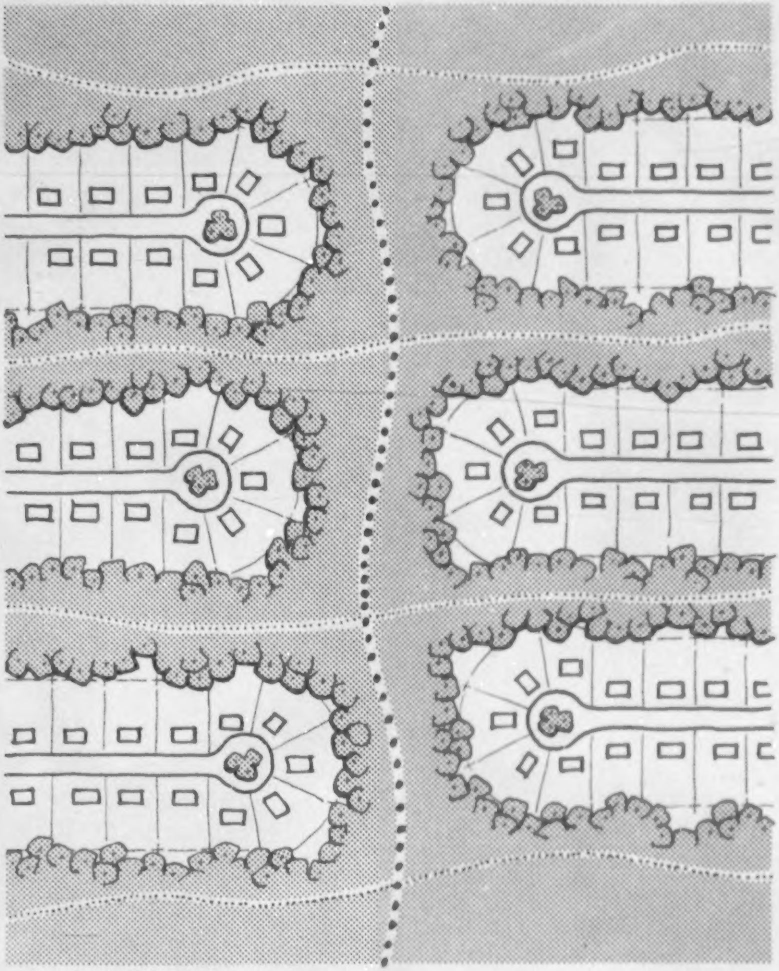
Loop Roads

loop roads offer direct access to some lots and orientation to an open space system. the interior of the loop can be divided into lots or used as a small green space or recreational area.



Open Space System

cluster development frees up land that can be used to provide an uninterrupted link to the trail corridor. the trail corridor is shown as the major spine on an open space system for a development.



Recreation

There are many forms of recreational activities that may occur along a trail corridor. The Appalachian Trail Study Group chose to look at four of these activities.

Camps

Provide seasonal outdoor recreational and educational programs for children. Normally, these camps are operated by a religious or fraternal organization and are open between early June and late August. They range in size from 20 to 200 acres and are often located in wooded areas. Structures within the camp may consist of an administration building, dining hall, restrooms, craft center, gym, pool, and clusters of tents or cabins on the perimeter. Many camps, however, are very primitive and provide little or no facilities.

A well designed camp environment can be compatible with the hiking experience. The peripheral areas of most camps are maintained in a very natural state and could be ideal as trail corridors.

Park

A park is a tract of land maintained by a public agency for use by the public. The recreational facilities available are usually developed in a centralized location and the remaining parkland is left in a natural state with emphasis given to maintaining an ecological balance. In many parks, internal trail systems exist for use by the park visitors. These trails range from short walks within the centralized development area to long trails into perimeter sections of the park. Little conflict between Appalachian hikers and park visitors will result if the trail systems are separated.

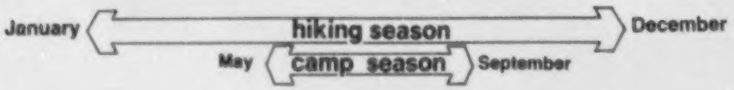
Ski Slopes

Ski areas may consist of several broad, cleared slopes which almost always face north. Mechanical lifts carry skiers to the ridgetops and usually a lodge and service buildings are clustered at the foot of the slope. The skiing season occurs during the winter months while most hiking and backpacking occur in the summer months. Therefore, there is little conflict between the skiers and hikers

Campgrounds

A modern campground is a facility designed to accommodate recreational vehicles with limited provisions for tent camping. Facilities include utility hook-ups for vehicles, restrooms, and limited recreational opportunities. The length of stay is usually short. These campgrounds may be either private or public. Hikers may benefit from the facilities available at a campground. However, it is desirable the campground be visually screened from the Trail.

Private Camps



Problems

security is the greatest problem with routing the trail through most camps.

since most camps operate only from june to august they would be vacant from fall to spring and many camp directors would be concerned about vandalism and theft during that time.

also many camps, especially girls' camps and camps concerned with younger children are very concerned about the safety of their campers and might be apprehensive about having hikers cross their property.

how much of a problem the trail presents depends on the individual camp, its regulations and philosophy. for instance, some scout or other camps might welcome hikers and enjoy sharing stories and outdoor skills with them. on the other hand, many private camps would probably prohibit the trail from crossing their property under any circumstance.

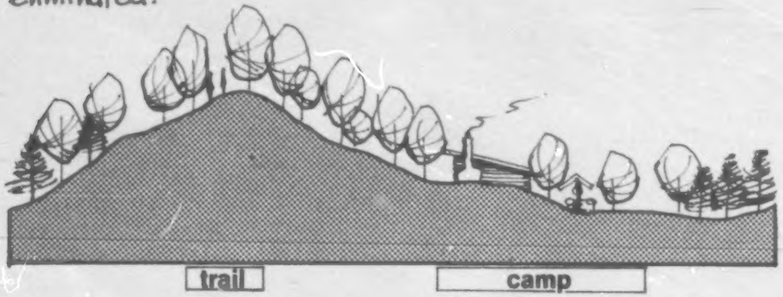
Solutions

if the individual camp will permit the trail to cross its property, it is still a good idea to route the trail in such a way that the hiker is not aware of the camps presence. this will not only provide the camp with security, but will most likely enhance the hiking experience along the trail.

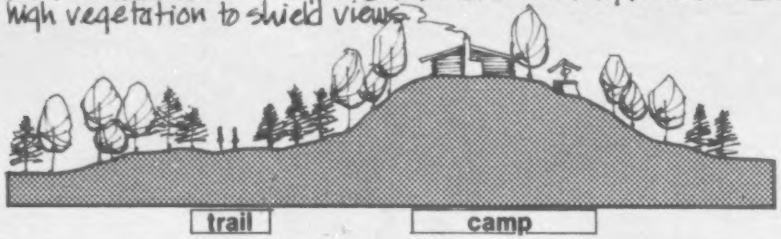
also, if a certain camp wishes to invite hikers into their camp they can post signs with directions, etc. along the trail. this still leaves the camp directors the option to remove the signs at the end of the season or whenever else.

Natural topography and vegetation can help shield the camp from the trail

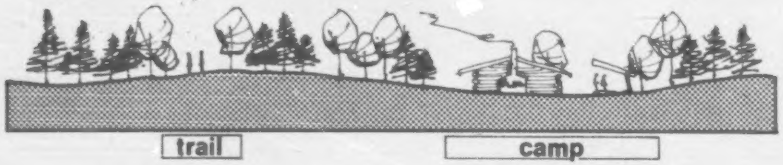
if the trail is moved to the opposite side of the ridgetop, the views and sound from the camp can be eliminated.



if the camp is located on the ridgetop and the trail must be located below it, a combination of low, medium and high vegetation to shield views.



thick vegetation, especially evergreen can be used to screen the camp.



The Hiking Experience in Park Land

most parks provide a natural environment ideal for hiking and since they are publically owned, the problem of future development or degradation is substantially if not entirely removed.

the "core" area of most parks can provide the hiker with many facilities and services such as:
- telephones
- showers
- first aid
- water
- garbage disposal
- parking
- social contact

Problems

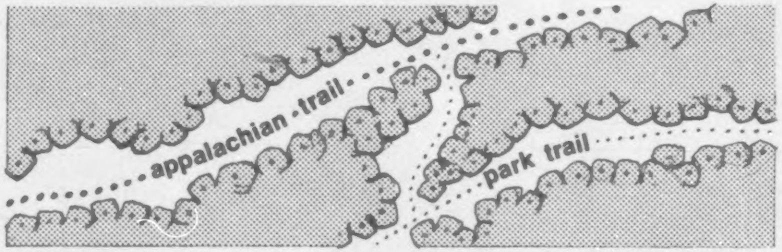
1. the use of the trail by many park visitors causes erosion, litter and other degradation.

2. the trail is often used by motorcycles, snow mobiles, horses, etc. which detracts considerably from the wilderness character.

3. overnight camping spots along the trail, such as the shelters, are overused causing many ecological problems in those areas.

Solutions

1. the appalachian trail should not become part of a park trail system. an access trail should be provided from the appalachian trail to the park so hikers can take advantage of the park facilities.



2. with the advent of modern, lightweight camping equipment, shelters are becoming less necessary. overnight camping areas along the trail could be designated by a color-coded tree blaze and when a particular area becomes ecologically "worn-out" it could be designated as a "resting" area by another color.

example: white blaze - appalachian trail
blue blaze - side trail
red blaze - acceptable camping area
yellow blaze - resting camping area.

hiking education would be important in implementing this system. interpretive signs at the park entrance could explain the system to hikers and emphasize its importance.

3. use of the appalachian trail by persons other than hikers (motorcyclists, horse-back riders, snow-mobilers, etc.) should be expressly prohibited.

enforcement by park and other officials is important and barriers may also be necessary. if barriers and signs must be used, they should be placed out of view of the trail whenever possible.

leaving fallen trees or large rocks across the trail in areas where motorcycles are a problem will also help to discourage, while not interrupting the hiking experience the way a man-made barrier would.

Ski Slopes

Problems

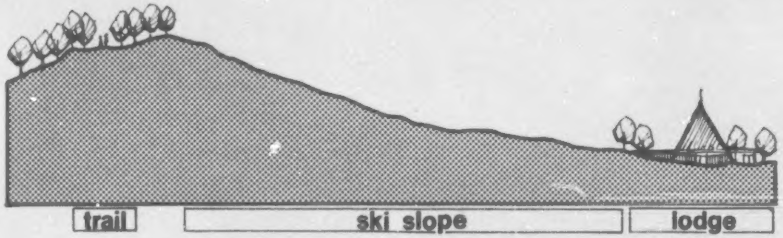
depending on the area and the individual ski slope a problem may or may not exist. crossing a ski slope clearing may provide the hiker with a spectacular or unattractive view of the area north of the ridge.

Solutions

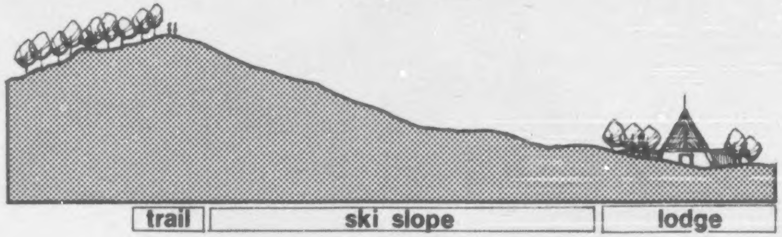
considering the individual site, a decision should be made as to whether the trail should cross any portion of the slope or if it would be more desirable to avoid it.

1. if it is decided for aesthitic or other reasons to avoid the slope, the trail should be routed on the southern side of the ridgetop.

this is propably the best solution and should always be considered as an alternative.



2. if the ski slope provides a good view for the hiker and there is no objection by the owners it may be possible to route the trail across some of the slope clearing



when possible the trail should cross the slope in such a location so that the hiker cannot see the entire slope and lodge area. rather, he should cross an area where he will be able to take advantage of the view while still feeling securely a part of the ridgetop.

Camprounds

Problems

although a commercial campground may provide a hiker with such things as: emergency aid, telephone, water showers, etc. it's visual and audial impact on the trail would be detrimental to the hiking experience.

the location of the campground, the amount of vegetation and the campground density determine the severity of the impact.

Solutions

since the amount of trees left within the campground greatly affect its visual impact, the developer should be encouraged to preserve as many as possible. it should be pointed out to the developer that this would make his campground much more visually pleasing, probably attracting more campers.

a campground located on a ridgetop creates the most negative visual impact, not only to the trail hiker but to everyone for mile's around.

the campground on a side slope creates less visual impact, it is visible from only one valley and trees begin to partially screen it.

the campground located in a gap has even less visual impact. since vegetation is usually thickest here, it may help to make the campground less visable.

however, since the gap is a restricted, enclosed space, it may be more difficult to locate the trail where the campground will not affect it.

Agriculture

Although the agricultural landscape is not wilderness, it is a natural landscape and complementary to the hiking experience. Agricultural land consists of cultivated fields and grazing pastures, interlaced with hedgerows. Two lane dirt roads are typical and traffic is usually light. Buildings are scattered and consist mostly of homes, barns, sheds and storage buildings.

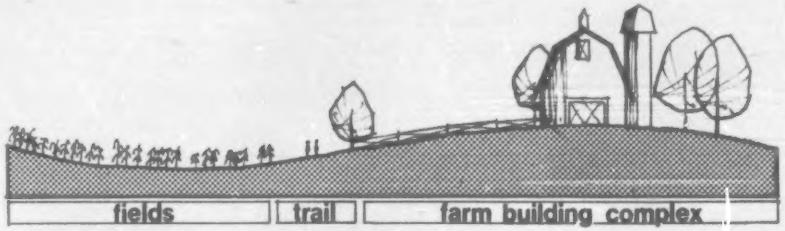
Increased agricultural use of the Appalachian corridor is unlikely; however, rerouting of the Trail from commercial or residential areas to farmland is a distinct possibility.

Possible solutions for rerouting the Trail across agricultural land depend on the landowner's feelings concerning the use of the land. Solutions for the following negative impacts on agricultural land should be considered.

1. Vandalism and theft of property
2. Unintentional damage to crops and fields
3. Invasion of privacy

The solutions presented show how a landowner may be protected from major inconvenience resulting from the Trail crossing agricultural land and also how to improve the hiking experience for the users of the Appalachian Trail.

The Hiking Experience in Agricultural Land



Problems

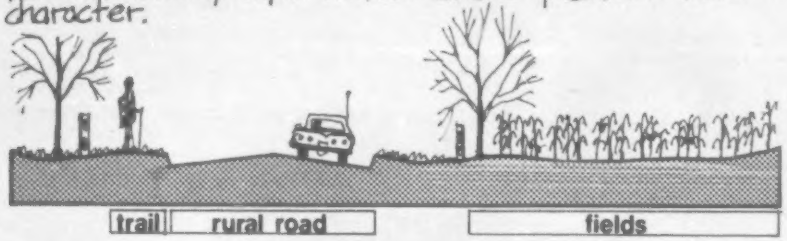
to the farmer:
- vandalism and theft of his property
- unintentional damage to crops and wear on fields
- invasion of his privacy

to the hiker:
- manure and fertilizer may make the area less appealling
- summer heat in fields may be very uncomfortable.

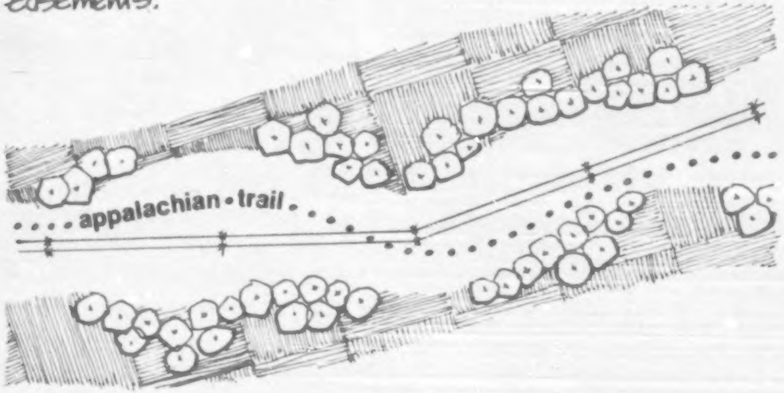
Solutions

solutions to taking the trail across agricultural land will depend greatly on the individual farmer and his feelings about the use of his land.

1. if a farmer will not permit the trail to cross his land the trail may be routed along a rural road if the road has sufficiently light traffic and a pleasant rural character.



or the trail may have to be routed along utility easements.



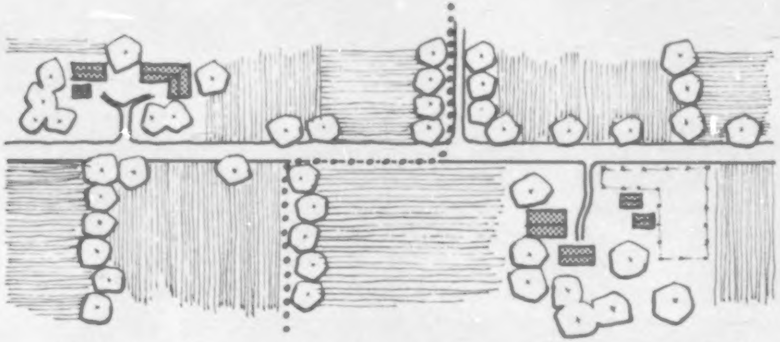
2. if the farmer demands reimbursement for the use of his land...

·the state may be able to arrange tax relief or other compensation

·the state and/or trail clubs may have to make payment to the farmer

·hikers or local trail clubs may be able to provide reimbursement to the farmer by doing work for him.

3. if the farmer will permit the trail on his land.



the best location for the trail would be along the hedgerows between fields. this would cause the least crop damage and also provide shade for the hiker.

the trail should have a direct a route as possible across agricultural land.

the trail should not be routed near farm buildings

some crops are more susceptible to damage than others and whenever possible the trail should be routed accordingly. ex.- corn and grain crops are less susceptible than fruit orchards.

the farmer may like to have signs posted where the trail enters his property, explaining his willingness to provide facilities.

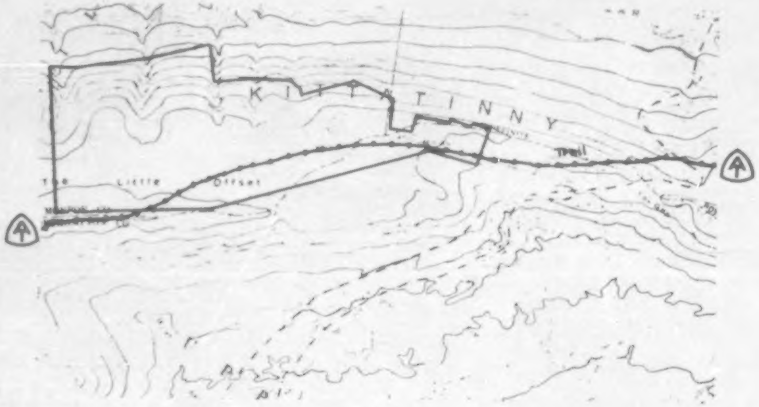
S. R. McDonald
Property
Water at House

Hikers Welcome
Please Close Gate

most importantly, the individual farmer must always be included in planning a trail to cross his land.

A Case Study*

To best illustrate how the protection strategy functions, a case study has been completed. The land use involved is residential. The Eaglo's View Lake second home development has been proposed on a site located five miles south of Stroudsburg, Pennsylvania, Kittatinny mountain. It is a flat topped mountain more specifically known as the Little Offset. It may be characterized as rocky, relatively flat terrain with the vegetative quality rated as low, Regionally, the site is relatively near the rapidly expanding recreational areas of the Pocoro mountains. Interstate 80 makes the site very accessible. In a more local context, with the purchase or grant of an easement for a direct access corridor, the site is additionally accessible from Pennsylvania route 191.



First contact with this project came during a site visit early in October of 1975. Senior students of Landscape Architecture at the Pennsylvania State University were studying the character of the land and the trail hiking experience. A sub-division plan, which had received preliminary approval by local planning authorities, was revealed to the group. Housing lots bordered much of the Trail. The proposed development would cause an intense use of the land, i.e. for roads, houses, utility lines, and cars. Encroachment of this kind would be greatly detrimental to the wilderness hiking experience.

CORRIDOR WIDTH

The developer seemed to place no value on the Appalachian Trail, and only a nominal corridor was allotted. The landform of this area is considered ridgetop, and the vegetative cover deciduous without understory. The recommended corridor width, established in step two of the protection strategy, for this and land use and landscape character ranges from a minimally acceptable width of1000feet to an ideal width of greater than 1600 feet. Negotiations with the developer to increase the corridor width have not taken place; however, for the purpose of this study it will be assumed that an increase was not acceptable to him.

THE NATURAL RESOURCE VULNERABILITY SCREEN

The rocky, often wet nature of the site made doubtful the feasibility of a 730 unit development on a 700 acre tract. At this point implementation of the third step of the Protection Strategy, The Natural Resource Vulnerability Screen, is necessary. Referring to the Land Use Vulnerability Chart found on page , it is noted that a subdivision involves soil erosion, vegetation, visual impact, surface and ground water pollution, and septic tank impacts.

SOIL EROSION VULNERABILITY

In determining the vulnerability of any one impact it is necessary to compile some basic natural inventory maps and supplemental data. Slope and soil maps were prepared for use in determining degree of soil erosion vulnerability. A preliminary soils report for development feasibility was already prepared by a geologist, in the employ of the developer. Some basic discrepancies were noted by the Appalachian Trail Study Group in regard to this preliminary report. Observations made during field visits to the site did not coincide with the data collected by the developer's geologist. So the Appalachian Trail Group compiled their own soild inventory. Sources used for the soil data were: Monroe and Northampton Counties soil surveys; airphotos; and the services of Dr. Robert Cunningham, professor of Soil Genesis and Morphology.

Soil descriptions of Northampton County, and for the most part Monroe County, indicate general unsuitability of the site for a housing development. Stoniness and slope presented severe to moderate limitations for most of the soils. Permeability, depth to bedrock, and high water table were also present as severe limitations (refer to soil map at section end for specifics). The soils present on the site were also greatly lacking in nutrients.

The slope map was prepared using the topo as a basis. Extensive slope renders most of the northern portion of the site unusable. Many of the half acre lots would be unsuitable due to problems arising from the deeply sloped areas. Development on relatively flat areas will increase runoff, which may lead to erosion problems in the sensitive steep areas. Erosion vulnerability is greatest where steep slope and low permeable soils combine. These areas are not suited for normal construction practices.

VEGETATIVE VULNERABILITY

On-site investigation was used to determine vegetative type and quality. Most of the vegetation on the site was found to be low in quality. Soils are shallow and rocky, lacking vital nutrients. Trees seldom grow beyond fifty feet in height, and the growth rate is very slow. Understory vegetation is sparse and low (except for ground cover in some areas). Major vegetative species include: Red, Black,

---

*See Note #4, Appendix B.

White, Scarlet, Chestnut, Bear, and Scrub Oak; Dwarf Chestnut Oak; Sassafras; Whitchhazel; and Pitchpine. Because of poor, shallow soils any disturbance of the present vegetation could lead to destruction that would be difficult to reverse. New stands of vegetation will be difficult to establish in the shallow, rocky soils. Vulnerability is especially high on the northern slopes of the site, where the slope is above 25%, and wind exposure is at a maximum. The ridgetop is highly vulnerable due to its high visual impact, and wind exposure. Minimal disturbance of vulnerable areas is a necessity.

VISUAL IMPACT

Visual impact was based on land form and unique site character. On site investigation and topo were used to arrive at conclusions. The most significant landscape element of the site is the ridgetop. It is especially vulnerable to development due to its extreme visibility. A unique feature of the site having special visual impact is Wolf Rocks (refer to SECTIONS 2 and 4 on page 76). From this rock outcropping one views: Camel Back Mountains, the Lehigh Water Gap, and the New Jersey Mountains. The unique vista deserves preservation. Any development harming the vista will have a detrimental visual impact.

SURFACE WATER POLLUTION

A series of first order streams originates on the site and flows northward. Although development is not proposed directly on these streams, runoff from construction areas upstream will pose a problem. Sediment pollution will be compounded by the steep slopes and the areas of impermeable, nonstable soils.

GROUND WATER POLLUTION

Depth to water table, slope, aquifer recharge areas, and permeability were used to decide vulnerability. In general ground water sources are deep and lie under Kittatinny Mountain. These sources are currently being used by the communities of Roseto and Bangor; they are not in danger of direct pollution. However, portions of the site contain high water table areas. These areas are highly vulnerable to pollution from septic tank effluent, and leachate from solid waste. Steep slopes, and high permeability aggravate this vulnerability in some areas.

SEPTIC TANK SUITABILITY

Slope, depth to water table, and soil permeability were the determining factors (developer's geologist report used as a reference). 71% of the soils are not suited to conventional septic tank absorption fields. However, it was stated in the geologists report that 62% of these unsuitable soils can effectively employ alternate systems. There are, however, limits on each type of alternate system; they are all more expensive, require more space, and many have not proven effective, thus polluting water sources.

Testing each lot for permeability is the only way to determine suitability, and the determining septic tank system required for that lot. If a lot does not pass tests for conventional systems, there are negative implications for both the buyer and developer. The buyer can choose not to build, or he can construct an alternative waste system at an increased rate. If a substantial percentage of the lots fail conventional tests, many buyers will not build. A spotty, incongruous development may occur. Roads, utility lines, and money will be wasted. An aesthetically poor development will result.

Note: Since the Study Group's involvement with this development, the developer has agreed to lower his total units to 540.

Acquisition and Conservation Solutions

There are numerous legal methods that can be used to protect the Appalachian Trail and its natural environment. Easements and acquisition are the more feasible for this particular case study. The easement can be purchased from the developer providing a right-of-way of adequate width for the Trail corridor. The most permanent protection is to purchase the property fee simple.

NOTE: The Department of Environmental Resources, along with the National Parks Service, is presently contemplating purchase of a portion of the site. The parcel under consideration would save the Wolf Rocks outcrop, views of Camel Back and the New Jersey Mountains, and the Lehigh Water Gap, and part of the existing Appalachian Trail Corridor. The area is densely vegetated and portrays a wilderness character. The possible acquisition of this parcel was considered in the design alternatives presented next.*

DESIGN SOLUTIONS

Design solutions can protect the Appalachian Trail from undesirable development. A good solution protects the Trail and its environment, establishes an aesthetic developmental plan, and is economically and physically feasible. The product of a logical design process is, generally, a good design. The design process used in this study consists of: 1. design concepts, 2. concept alternatives, 3. design criteria, and 4. design alternatives (solutions).

1. Design Concepts
   Clustering:

   A more intense use of land in one area yields greater open space in another. This is the underlying concept of cluster development. The open space may be used to link different clusters and interest points in the development. Specifically: The design of the Eagle's View Development could incorporate a unifying integral open-space system that would be linked to the Appalachian Trail Corridor. In this situation the trail could retain its existing character; however, it might suffer from increased use. Permanence of an open-space system as part of a development is often a big concern of homeowners. If the Trail Conference agreed to such use of the corridor, the maintenance and permanence of the Trail could be insured

---

*See Note #5, Appendix B.

2. Concept Alternatives

   a. To employ the actual Trail Corridor as the spine of the open space system of a cluster development. However, it is unlikely that a wilderness hiking experience could be retained under this condition.

   b. To alter the development criteria by reducing total lots.

   c. To reroute the Trail around the development using land unsuitable for housing, i.e. steep slopes, vulnerable soils, etc.

   d. To retain the Trail location and provide a 1600 foot corridor through the development.

The design concepts are reviewed. Those which are not satisfactory are altered or deleted. Some of the concepts are combined to arrive at logical design solutions.

3. Design Criteria

Features a Second Home Buyer Looks for:

a. Privacy, but not remote situation. A casual relationship with neighbors may be desired.

b. Access to natural areas.

c. Availability of recreation areas.

   -organized or formal there should be centrally located and away from the Appalachian Trail

   -informal - example: the Trail corridor

d. Generally, he may desire of most modern conveniences

   -electricity

   -communication

   -water

   -sewage disposal

   -easily drivable access roads

   -possibly a source for basic necessities example: general store

STRUCTURE DESIGN AND SITE PLANNING

This is a second home development in which there may be a design variability of the units built. However, some basic criteria should be established to insure an aesthetically pleasing development for the residents, and the Trail hiker who may be exposed to it.

a. Each unit should be located to take best advantage of the topography. Grading is expensive and often destroys natural landforms and views.

b. Units should have varied setbacks to avoid monotony and enhance the aesthetic quality.

c. No unit should be closer than 1600 feet from the Appalachian Trail.

d. Structures should be built of natural materials. Examples are natural woods, use of earth tone paints (light brown, light green, earth reds, etc.).

e. Simple, natural overall design of structure and site.

f. No mobile homes.

g. Site use limitations such as:

   -no campers or trailers

   -no off-road vehicles

   -no cutting of trees or understory for cleared areas (other than septic tank absorption fields) or for fire wood

h. An overall utilities plan

   -underground lines preferable

ROAD SYSTEM

A general hierarchy of roads should be planned; main access route, collector roads, minor streets. However, in a second home development the main access may also serve as a collector. Other concepts to be followed:

a. As little paving as possible to save money and land.

b. Alignment and layout should conform to the existing landscape to avoid major cuts and fills. Curvilinear alighments usually work best with the landform both physically and aesthetically.

c. Roads should never be routed down the Trail corridor or adjacent to it.

d. A distance of 3000 feet should be maintained as a buffer between the roads and the Trail.

e. Loop streets and cul-de-sacs work well with the clustering concept.

f. If possible, the road system should be depressed or located down slope from the Trail. This utilizes the landform to deflect sound up and away from the hiker.

g. If it is possible to provide a reasonable distance of natural woodland between the Trail and the road system, basic planting principles should be implemented for noise reduction.

VULNERABILITY

Levels of natural suitability should be mapped. Degree of limitation should be considered in locating the physical features of the design. A comprehensive site analysis is a necessity. In this way usable areas may be determined, and proper sensitive use of the land can be implemented.

DESIGN ALTERNATIVES

Alternative 1

This is the first in a series of preliminary design solutions. It is an intense use of the land with Wolf Rocks preserved from development. The Appalachian Trail would be moved to steeper land north of the development.

Alternative 2

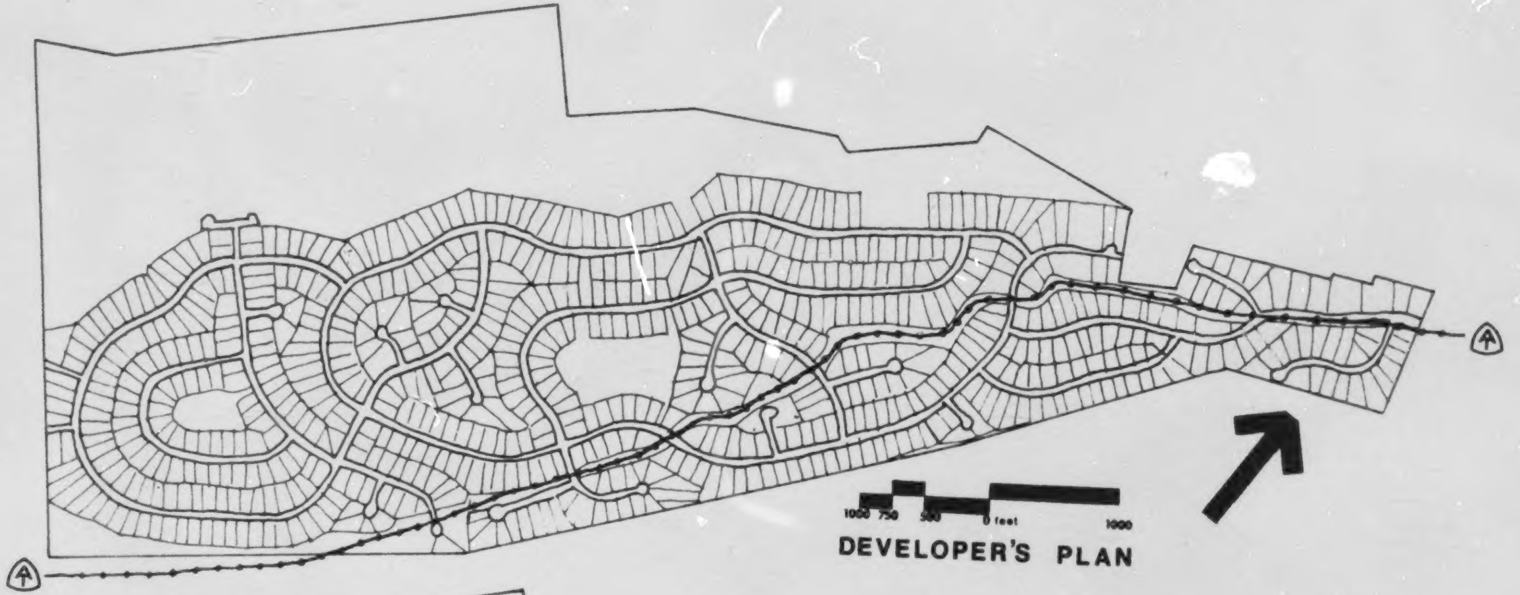
This plan is more sympathetic to the land. The nature of the topography on the site (a series of parallel swales) lends itself well to the use of cul-de-sacs.

Alternative 3

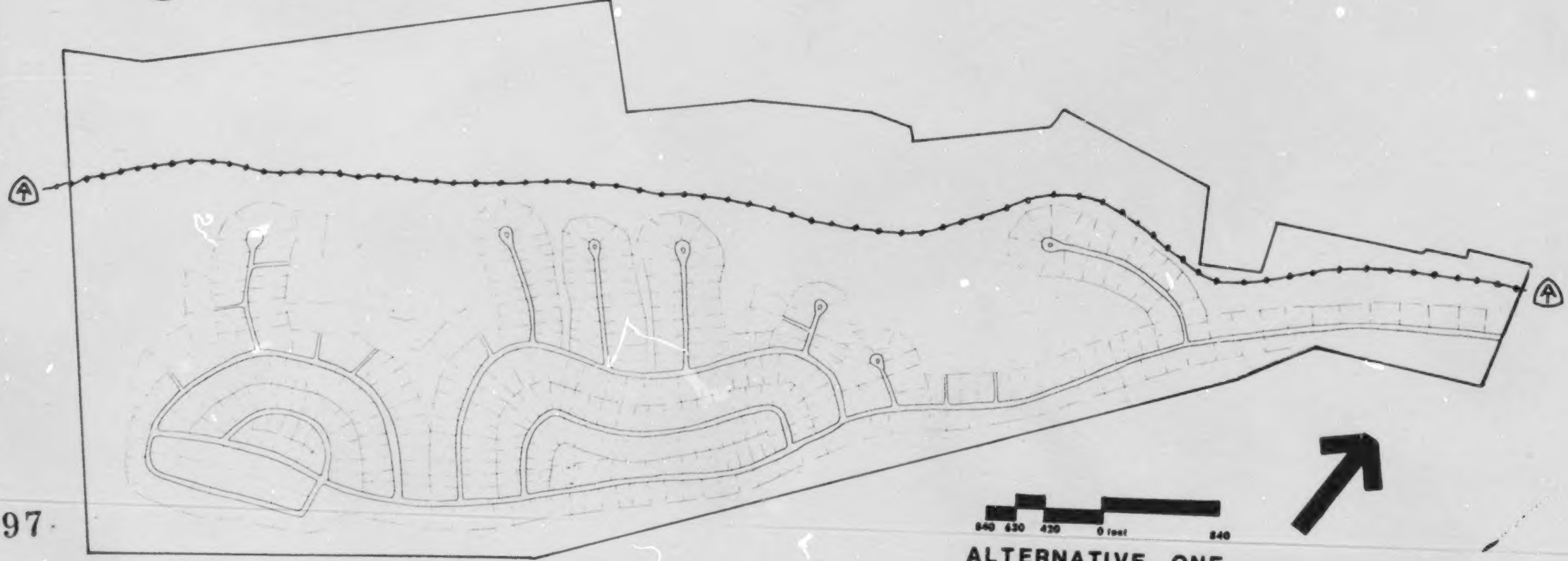
This scheme places importance on the sensitivity of the soil. Variation in lot size is directly related to soil permeability. A tighter arrangement of cul-de-sacs facilitates more lots. Each lot is provided access to common open space. Only neighborhood traffic occurs on the cul-de-sacs, no through traffic. This criteria should make the lots higher in quality, more valuable, and saleable.

This type of development is more desirable for the developer. Money is saved because the road area is drastically reduced. The main road is 50 feet in width, the cul-de-sacs are 35 feet (local codes require 22 feet).

The previous text and following maps and charts illustrate some of the analyses and considerations municipalities should exercise in evaluating the impact of proposed development which would affect the Trail. Shown are: the land development plan submitted by the developer; several proposed alternative development designs; a final design recommendation by the Study Group; and, a number of charts which depict lot sales comparisons.


1000 750 500 0 feet 1000

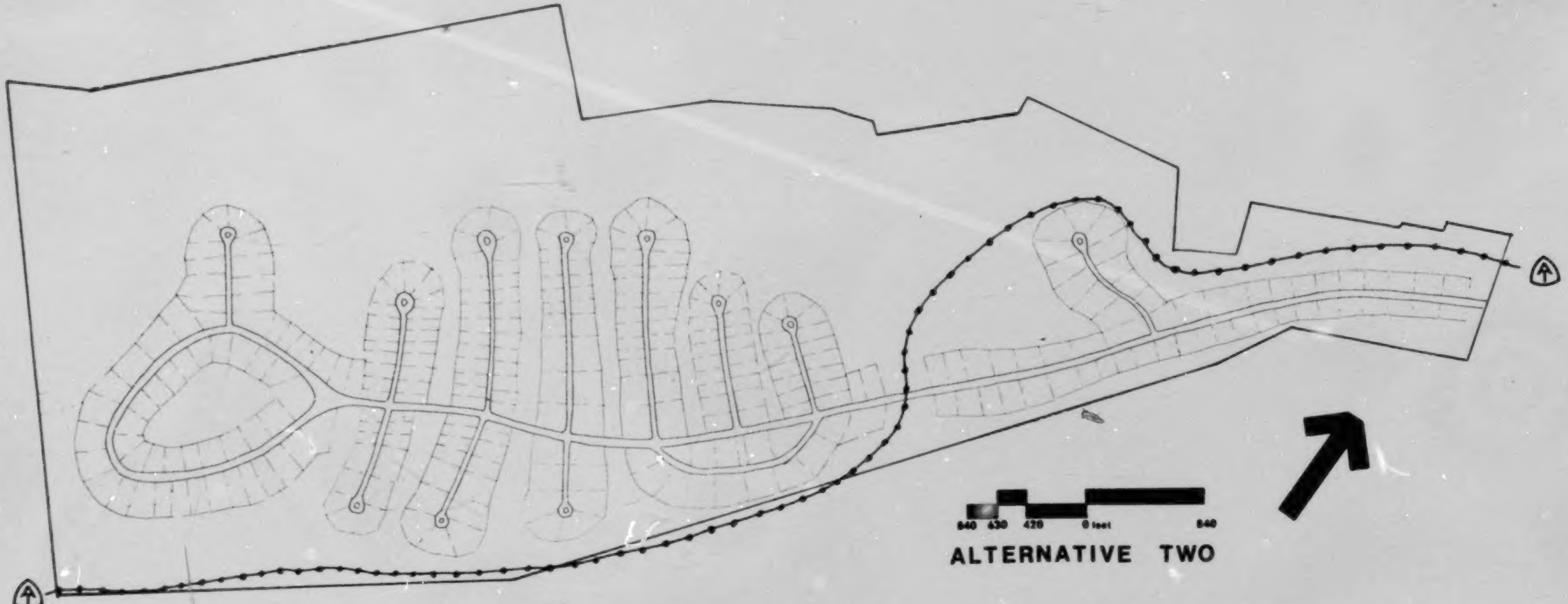
DEVELOPER'S PLAN


840 630 420 0 feet 840

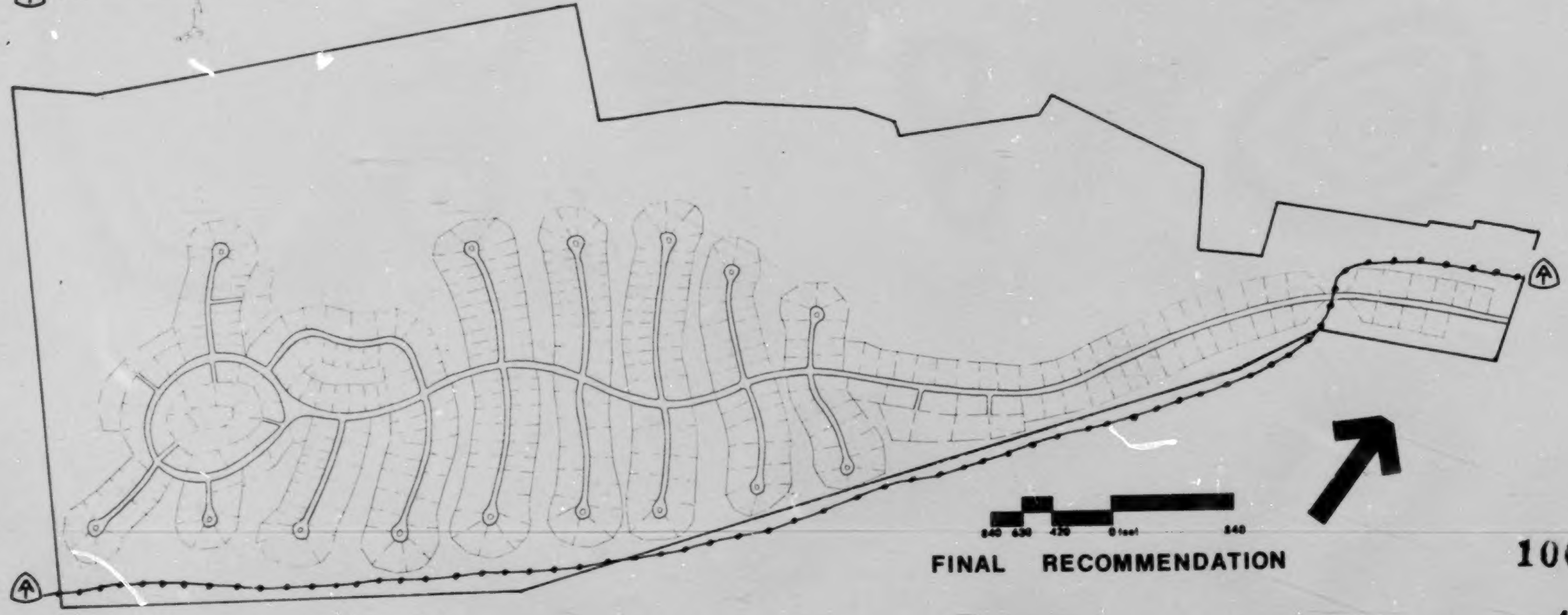
ALTERNATIVE ONE

97

98


840 630 420 0 feet 840

ALTERNATIVE TWO


840 630 420 0 feet 840

FINAL RECOMMENDATION

100

99

COSTS OF DEVELOPMENT

The three alternatives shown, which are designed to be more sensitive to the natural features of the site, reduce the number of housing lots which can be developed. Under the developer's original plan, there are 540; the alternatives show 385, a loss of 155 lots. Although, at first glance, it may seem that this would represent an unacceptable loss of revenue to the developer. In fact, the developer realizes substantial savings in road construction--nearly enough to offset his loss in lot sales.

The figures below will show the reasoning, assuming $8000 per lot is the sales price.

DIFFERENCES IN GROSS INCOME FROM LOT SALES

Number of Lots	Cost per Lot	Gross Income
540	5,000	2,700,000
385	5,000	1,925,000
		775,000 dif.
540	8,000	4,320,000
385	8,000	3,080,000
		1,240,000 dif.
540	10,000	5,400,000
385	10,000	3,850,000
		1,550,000 dif.

ROAD AREA COMPARISON

Lineal Feet	Width	Cost
Developer's Plan:		
45,950 ft.	50 ft.	$2,297,500
Alternate Plan:		
main access 11,000 ft.	50 ft.	575,000
collectors 14,200 ft.	35 ft.	497,000
flags 2,000 ft.	25 ft.	50,000
		$1,122,000

DIFFERENCES

Developer's Plan	$2,297,500	
Plan with cul-de-sacs	1,122,000	
	$1,175,500	amt. saved
Developer's Plan	$2,297,000	
Plan with Loops	1,384,000	
	$ 913,000	amt. saved

OVERALL COST COMPARISON

Example: 540 lots at $8,000 versus 385 lots at $8,000

The developer earns	$1,240,000	less with 385 lots
The developer saves	$1,175,000	in roads with cul-de-sacs
The developer takes in	$ 64,500	less overall

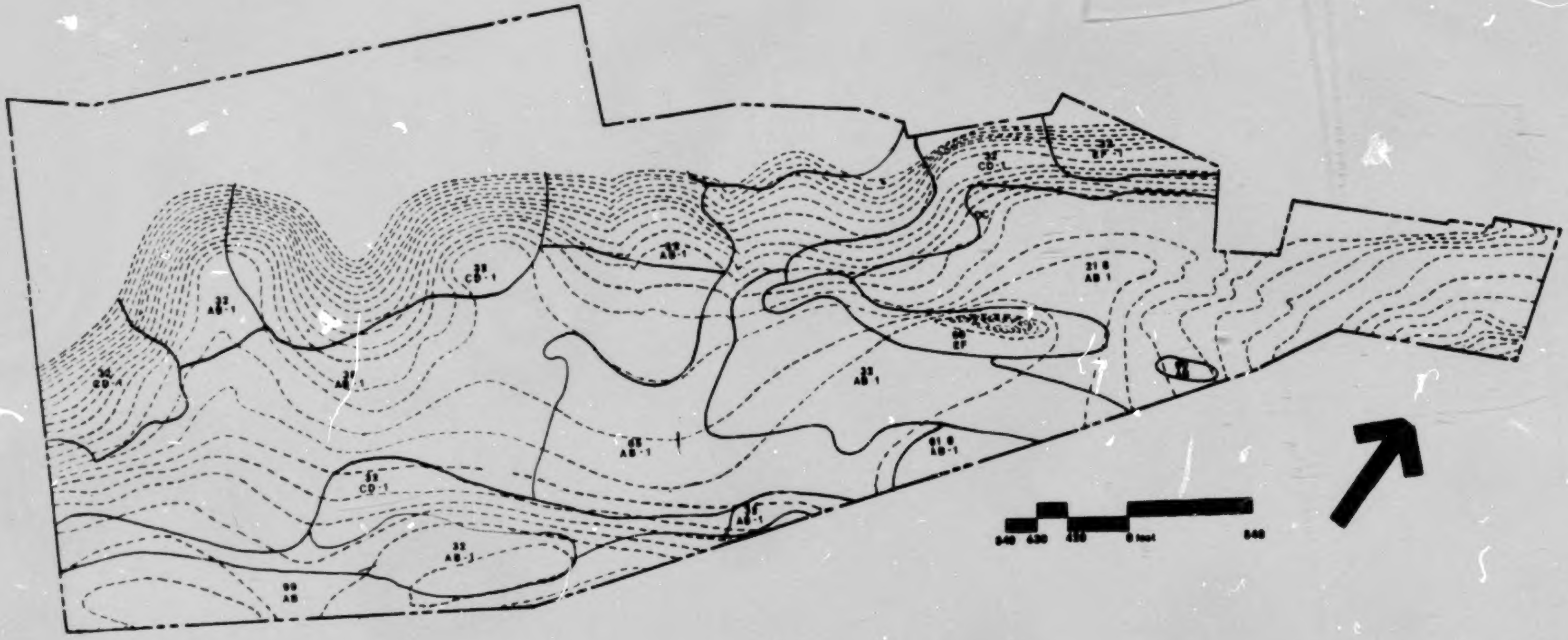
CONCLUSION

Through this study it is hoped the developer will: 1. realize the value of the Appalachian Trail, and 2. the developer will more carefully review his site with respect to the delicate relationships of natural systems, and the implications of the development on those systems. He may then incorporate some basic natural systems criteria into his design achieving a development more sympathetic to the land and the Appalachian Trail.

The previous discussion and following maps illustrate at least part of the review process that local governments will want to consider when land development is proposed adjacent to and on the trail.

SOILS MAP

35 / AB-1	EDGEMONT VERY STONY LOAM - deep, generally well drained soils; may have shallow bedrock and rocky conditions; unsuitable for proposed pond construction
21 S / AB-1	SWARTSWOOD VERY STONY SANDY LOAM - very stony with depressions, potholes, and wet areas; presence of fragipan.
32 / AB-1	DEKALB VERY STONY LOAM - (0 - 8% slope) moderately deep, well drained soils; use problems due to stoniness, bedrock, and slow permeability.
32 / CD-1	DEKALB VERY STONY LOAM - (8 - 25% slope) moderately deep, well drained soils; use problems due to stoniness, bedrock, and slow permeability.
32 / EF-1	DEKALB VERY STONY LOAM - (Above 25% slope) moderately deep, well drained soils; use problems due to stoniness, bedrock, and slow permeability.
65 / AB-1	DRIFTON VERY STONY LOAM - deep, moderately well drained soils; high water table; very slow permeability.
61 / AB-1	SHELMANDINE - deep, poorly drained soils; very high water table ruling out most uses.
99 / AB	VERY STONY AND ROCKY LAND - (0 - 8% slope)
99 / EF	VERY STONY AND ROCKY LAND - (above 25% slope) rock land often extremely steep; totally unusable.


32 CD-1
32 EF-1
32 AB-1
32 CD-1
32 AB-1
21 S AB-1
32 CD-1
32 AB-1
99 EF
32 AB-1
65 AB-1
61 S AB-1
32 CD-1
32 AB-1
32 AB-1
99 AB
840
630
420
0 feet
840

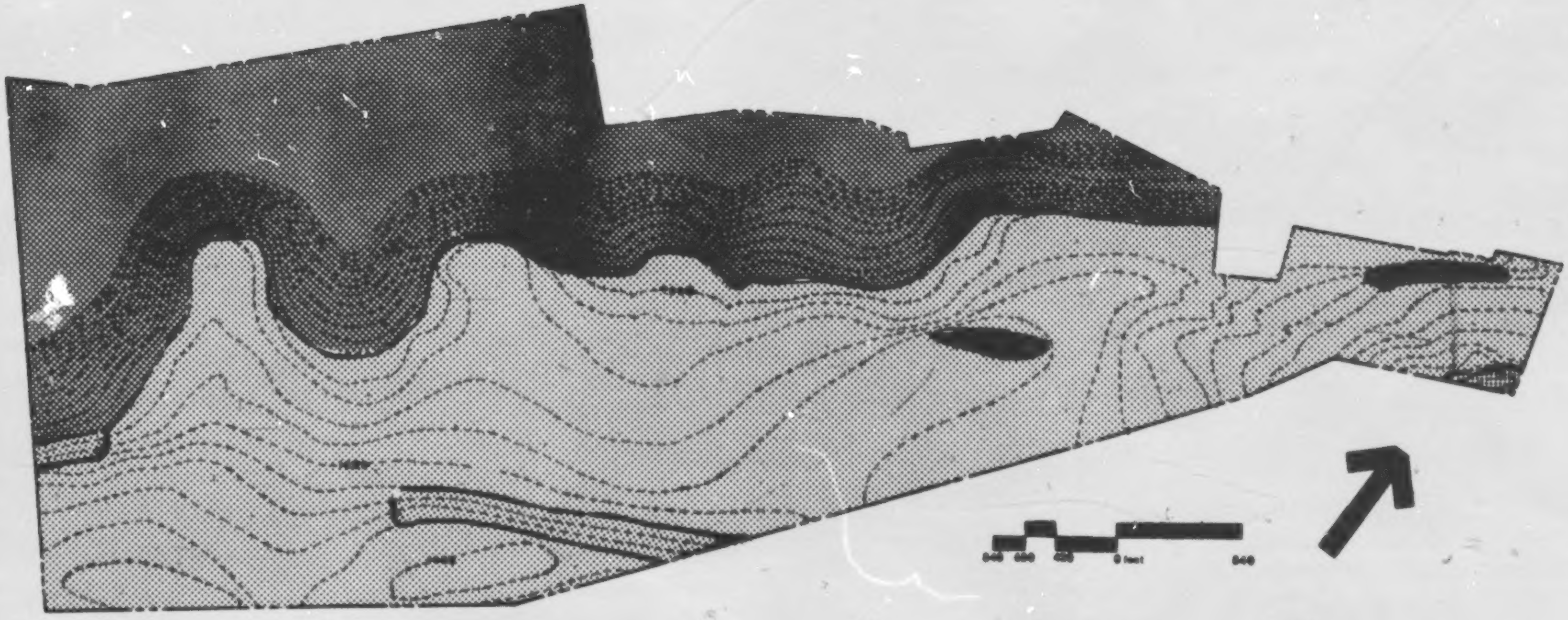
SLOPE MAP

▨ 0 - 8 %

▨ 8 - 25 %

▨ 25 % +

Much of the northern portion of the site is unusable due to excessive slope. Development on the relatively flat areas will increase runoff, and may cause problems (erosion) in the sensitive steep areas.



SEPTIC TANK SUITABILITY

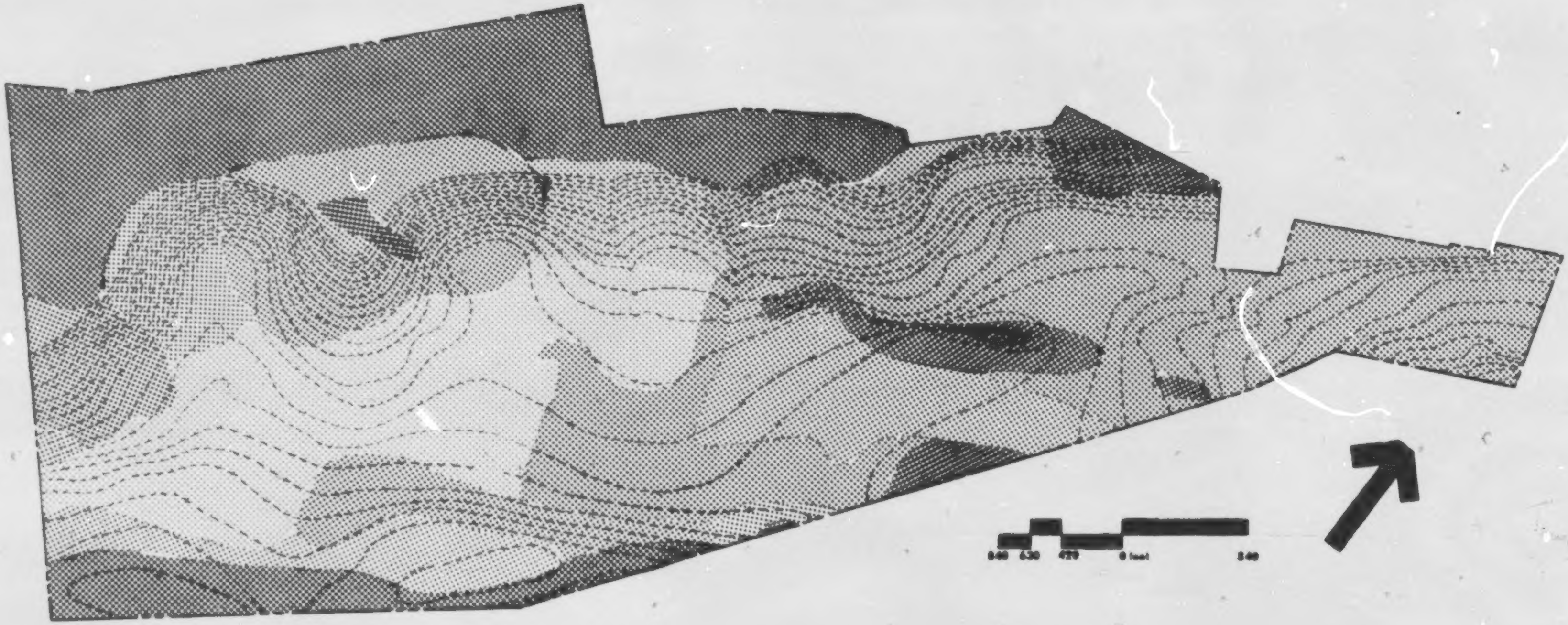
□ **Generally Suitable**

░ **Moderately Suitable**

▒ **Generally Unsuitable**

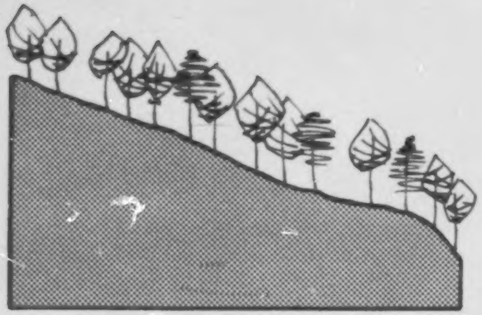
▓ **Totally Unsuitable**

Preliminary assumptions can be made from existing data. Testing of each lot is required to determine precise suitability, and type of septic system required. Many unsuitable areas probably exist within the suitable areas.

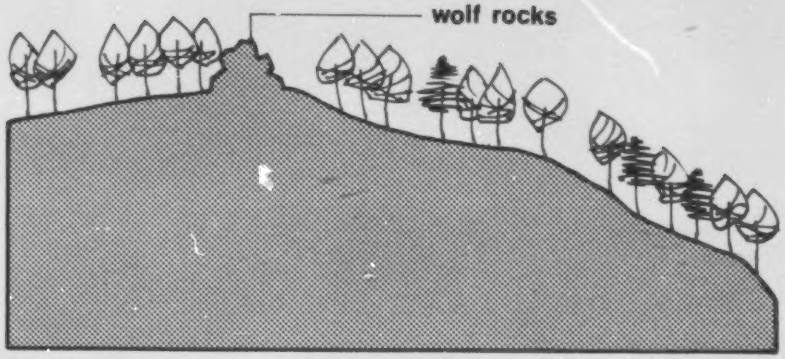


108

107



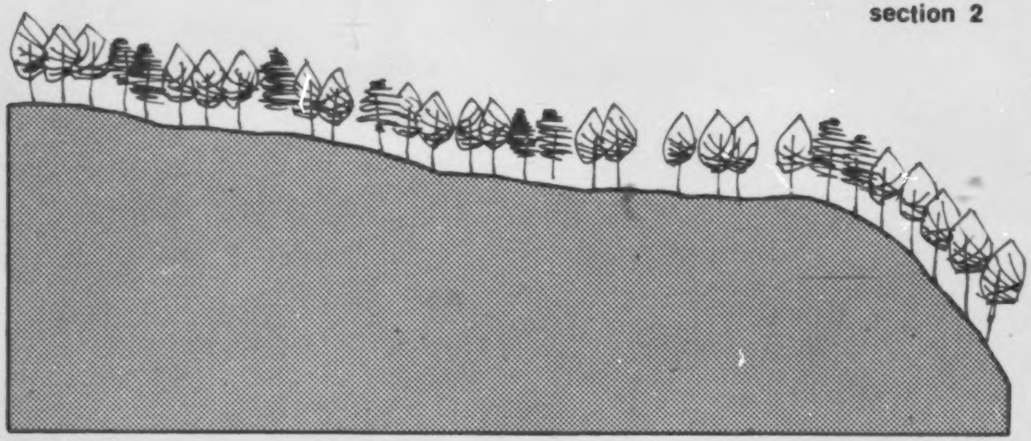
section 1



section 2

Sections of Eagle's View Housing Site

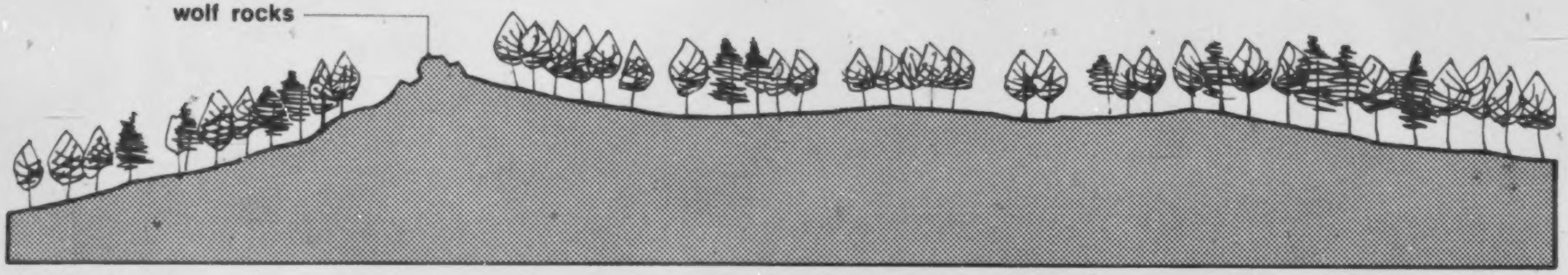
horizontal scale 1" = 400'
vertical scale 1" = 40'



section 3

SECTION 1, 2, & 3

These sections reveal the general character of the site. The sections were taken at intervals as one walks into the site from east to west. Immediately the developable land stands out. More importantly, there is substantial area that is unusable for residential development, and it could be adversely affected by the adjacent development.



section 4

Character of the site looking from the north. The outcrop is Wolf Rocks.

Study Areas

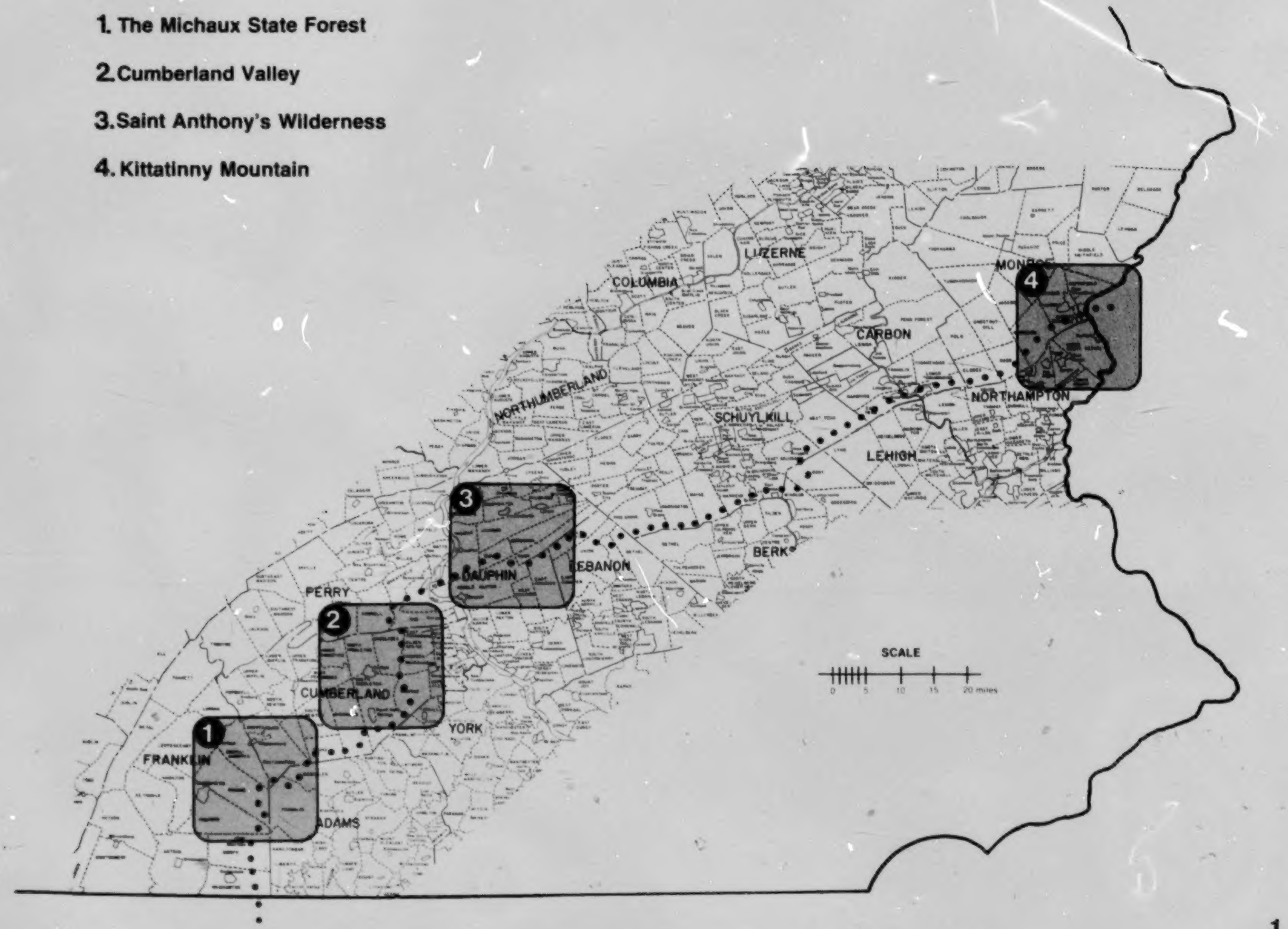
INTRODUCTION TO STUDY AREAS

Three segments of the Appalachian Trail were suggested by the Department of Community Affairs for detailed study. The areas suggested suffer from acute deterioration of the hiking experience. They include the Michaux State Forest, Saint Anthony's Wilderness, and Kittatinny Mountain. A fourth area, the Cumberland Valley, was included by the Appalachian Trail Study Group. The valley was considered by the Group to be the weakest link in the Trail.

The major problems encountered in the Michaux State Forest are overuse and vandalism. In the Cumberland Valley major concerns include commercial, industrial, and residential development pressures. Also, the Trail follows roads and highways through much of the valley. Saint Anthony's Wilderness is threatened with a pump storage electricity production facility to be built in close proximity to the Trail. The last study area, Kittatinny Mountain, is the proposed site of a 740 unit second home development, which threatens to cut the Trail.

It is important to note that the following recommendations are based on preliminary investigations, and reflect the findings and opinions of the Appalachian Trail Study Group. Increased participation by the Appalachian Trail Conference, local trail clubs, local government officials, and professional consultants should be encouraged so that even better solutions can be identified.

1. The Michaux State Forest
2. Cumberland Valley
3. Saint Anthony's Wilderness
4. Kittatinny Mountain


LUZERNE
COLUMBIA
MONROE
4
CARBON
NORTHUMBERLAND
SCHUYLKILL
NORTHAMPTON
LEHIGH
3
DAUPHIN
LEBANON
BERKS
PERRY
2
CUMBERLAND
YORK
1
FRANKLIN
ADAMS
SCALE
0 5 10 15 20 miles

The Michaux State Forest

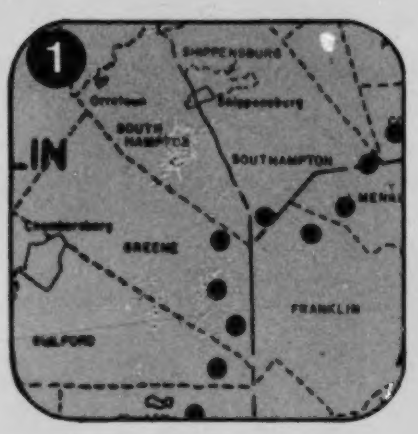
The Michaux State Forest is the first significant segment of public land encountered by the Appalachian Trail as it enters Pennsylvania from Maryland. There are two state parks within this forest: Caledonia State Park, and Pine Grove Furnace State Park. Problems associated with the Trail are concentrated at these locations.

The Appalachian Trail as it passes through Caledonia and Pine Grove Furnace State Parks is rapidly loosing its wilderness character. Large population centers such as Washington, D.C.; Baltimore, Maryland; and Harrisburg contribute heavily to the overuse these parks receive each year. In addition, the number of visitors each year is expected to increase.

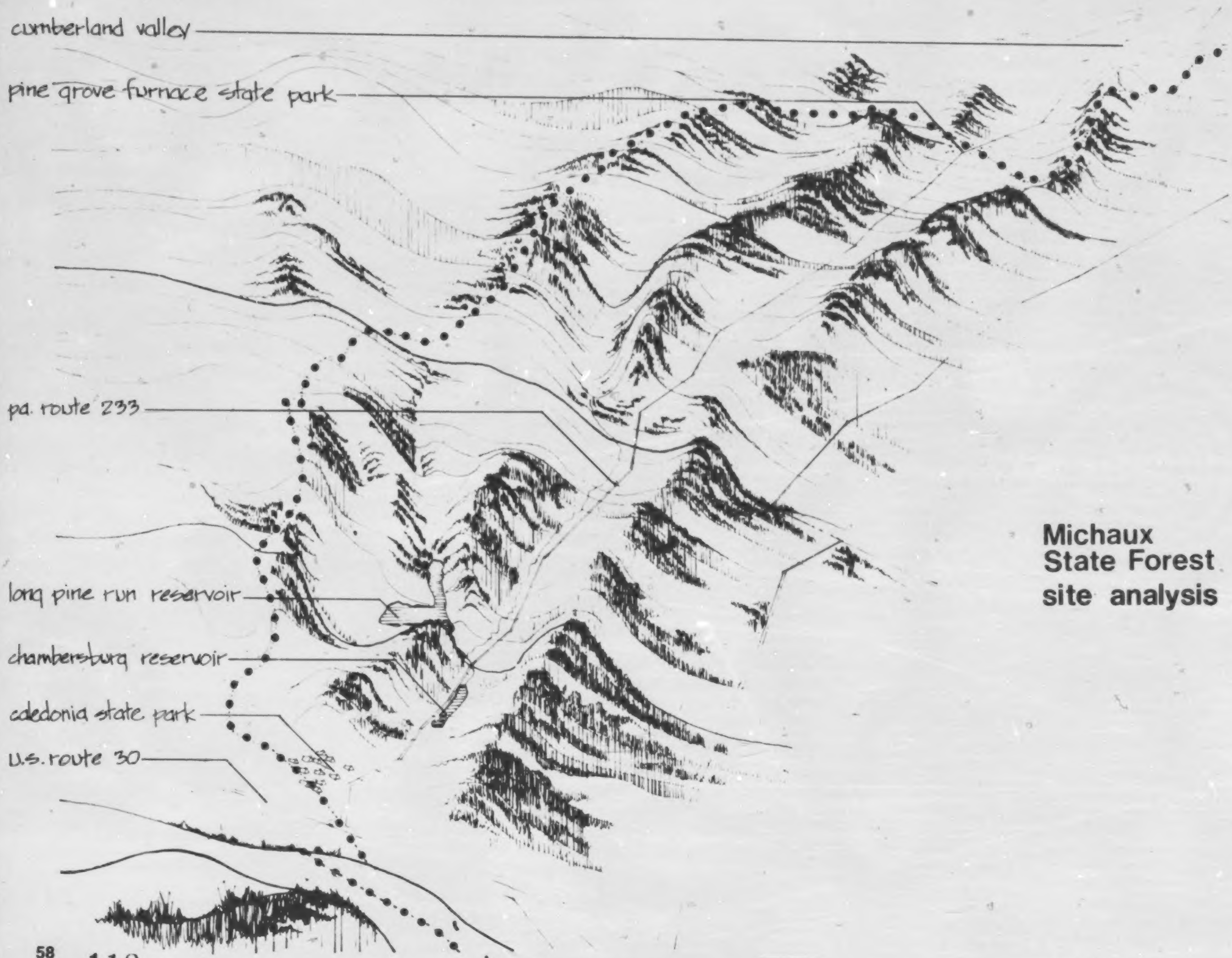
Vandalism and overuse by park users constitute the major Trail problems. The Appalachian Trail suffers from overuse because it is integrated into the loop trail systems maintained by the State Parks. Because of its proximity, park users are encouraged to use the Trail. In order to return the Appalachian Trail corridor to a "wilderness" environment desired by hikers, the Trail should be rerouted to a more primitive and less accessible part of Michaux State Forest.

In addition, the internal park trail system should be separated from the Appalachian Trail. To accommodate hikers wishing to use the Park facilities and those desiring to hike the Appalachian Trail, an access trail should be provided. This trail should be long and difficult to discourage other Park users. Usually, only serious hikers will make the effort to reach the Appalachian Trail.

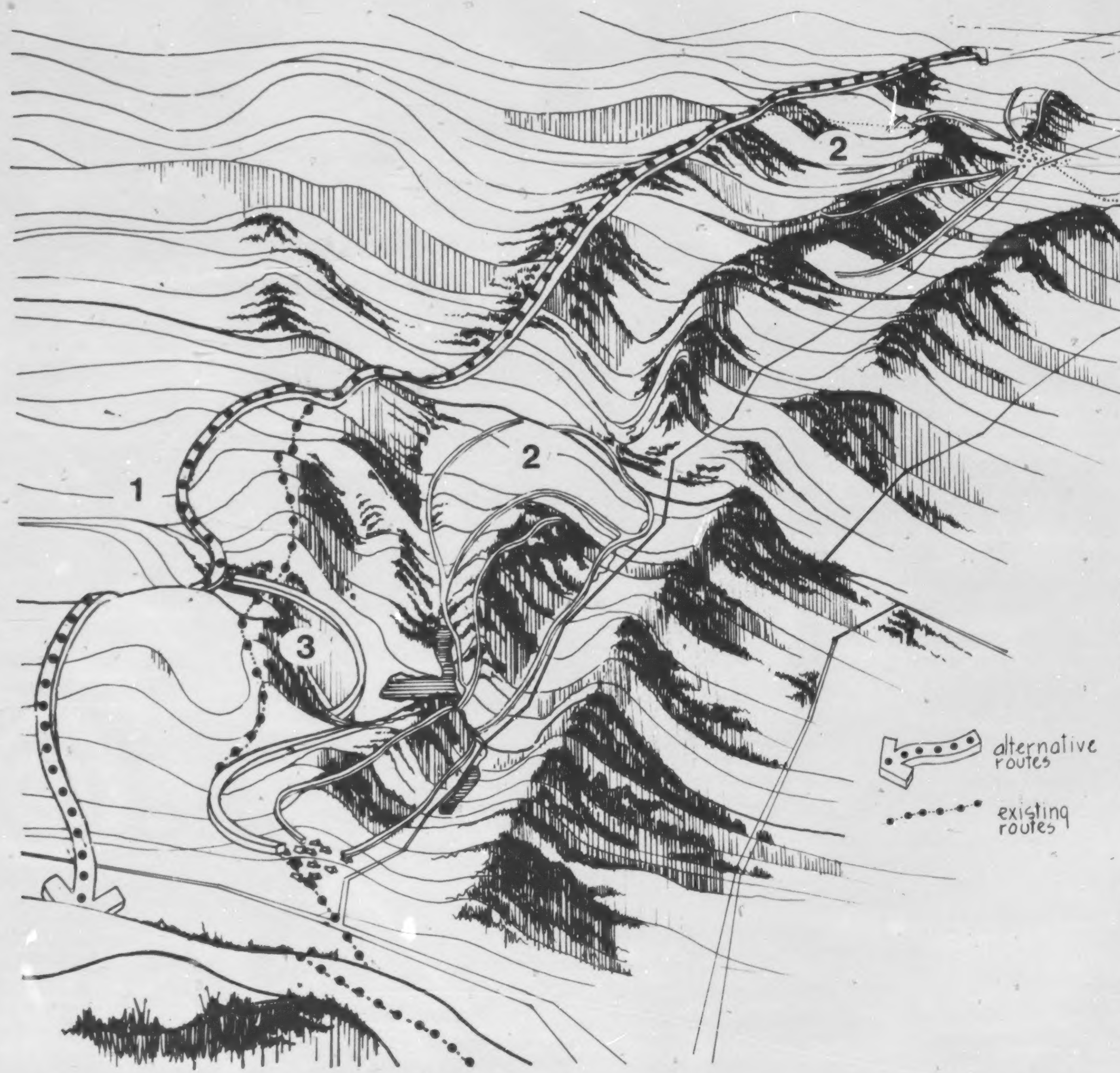
Presently, the Trail is advertised within Caledonia and Pine Grove Furnace State Parks. All but minimal acknowledgement of the Trail's existence should be removed.



p. 56 blank


cumberland valley
pine grove furnace state park
pa. route 233
long pine run reservoir
chambersburg reservoir
caledonia state park
u.s. route 30

Michaux State Forest site analysis


2
1
2
3
alternative routes
existing routes

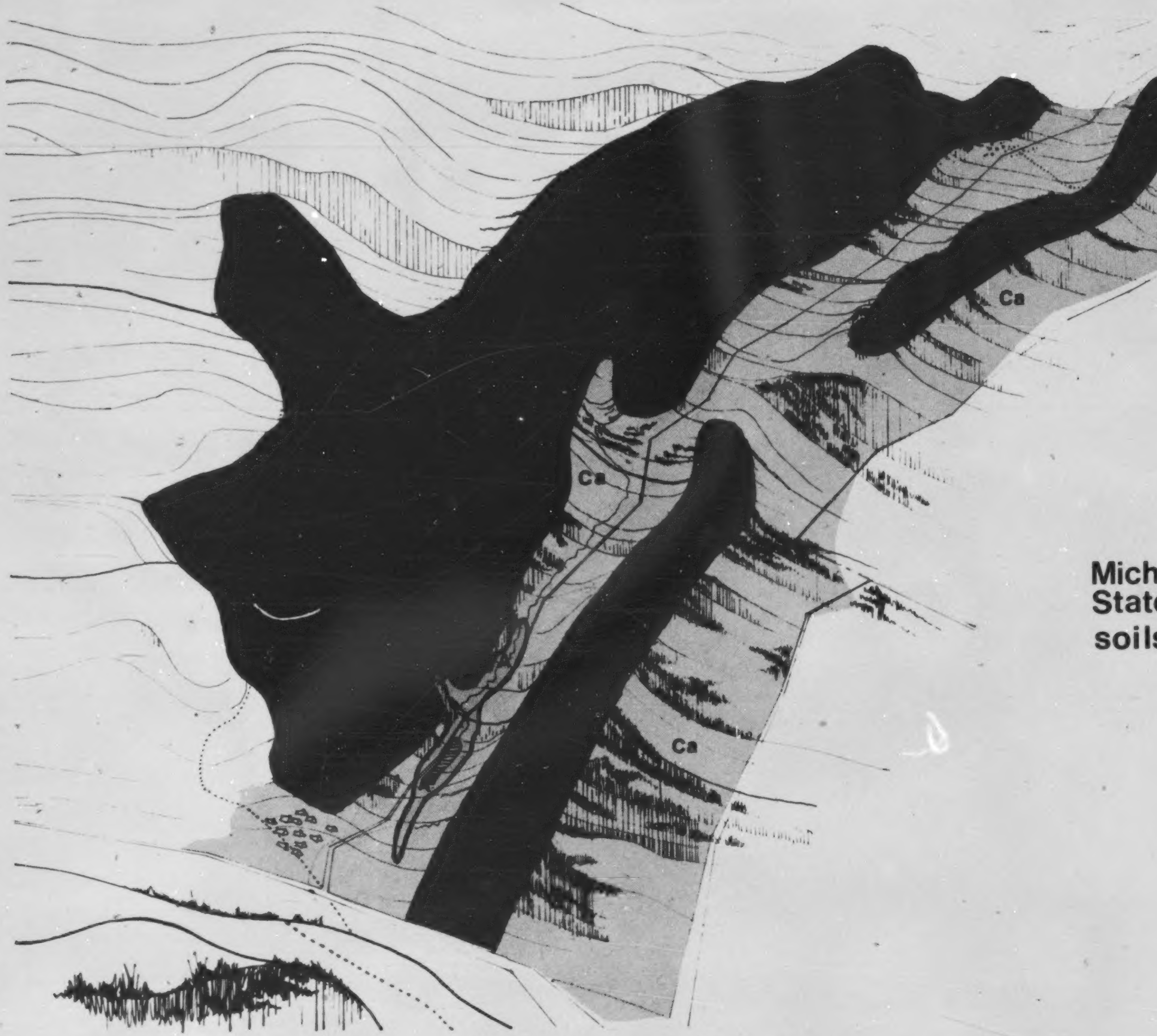
Michaux State Forest alternative routes

1 the appalachian trail should be rerouted to a more remote and primitive portion of the forest

2 the forest and park trail system should not connect with the appalachian trail

3 provide a side trail to subtly connect the park trail system with the appalachian trail

Dkt	Appalachian Dekalb-Lehew-Laidig	good drainage, yellowish gray with grayish yellow to brown sub-soil, slope range 15-45%, average slope 25%, stony sandy loam, residual to semi-residual, geologic source--gray and brown acid sandstones, location--Appalachian mountain ridges
Ca	Caledonia Highfield	good drainage, ashy gray brown with ashy gray to bluish brown sub-soil, slope range 3-25%, average slope 8%, silt loam, residual, geologic source--metamorphosed aporhyolite lava flow, location--south areas of South Mountain
A	Alluvial Flood Plain	fair to poor drainage, brown to gray, slope range 0-5%, average slope 2%, silty to sandy, alluvial flood plain deposits, geologic source--yellowish gray acid sandstones and shales, location--Alluvial Flood Plain



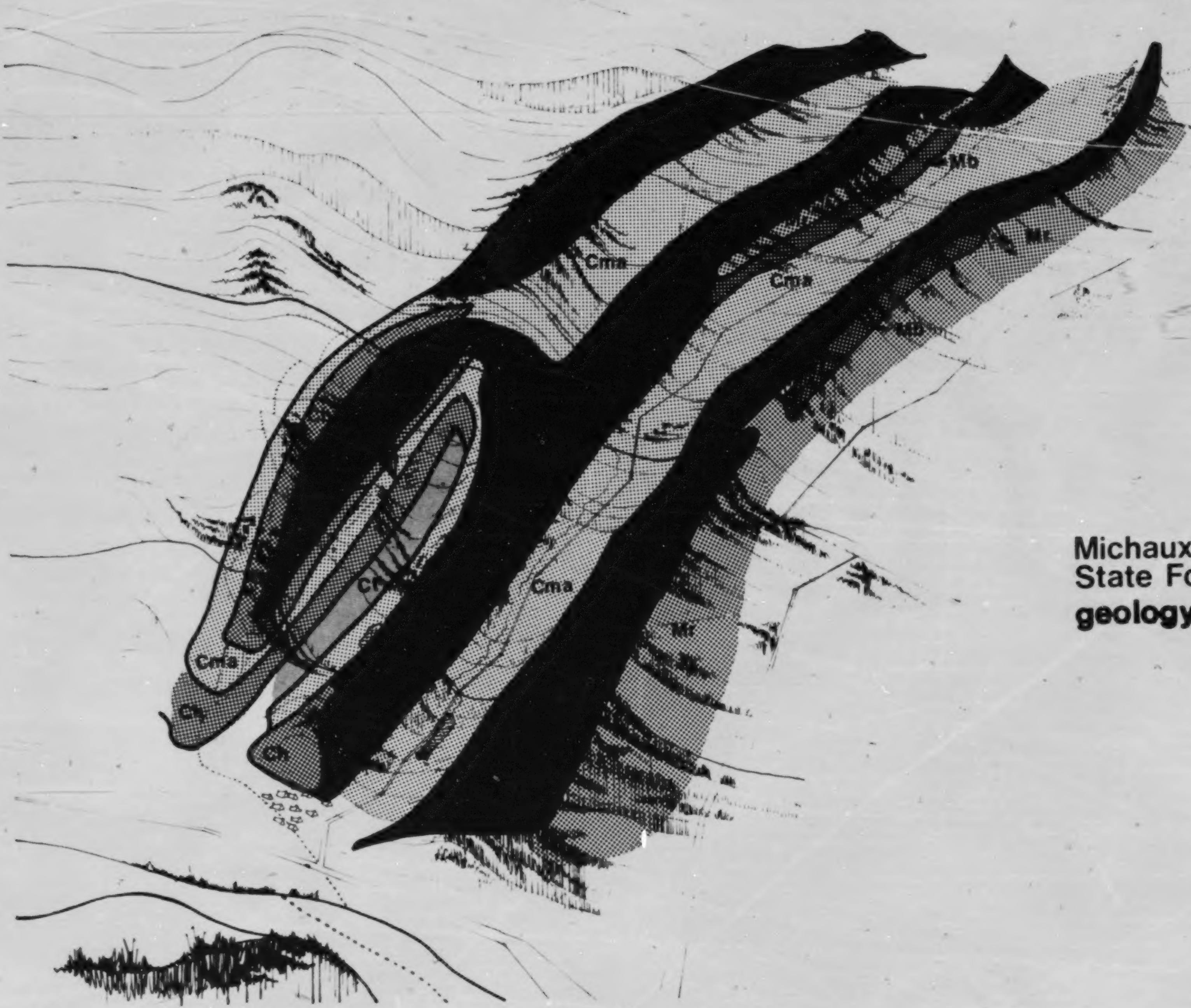
Michaux State Forest soils

124

123

Cma	Harpers Formation Mont Alto Member	gray quartzite
Ch	Harpers Formation	dark greenish gray phyllite and schist with thin quartzite layers
Cwl	Weverton Formation	gray to purplish gray; feldspathic quartzite and quartzose conglomerate in hard resistant beds containing rounded pebbles
Ct	Tomstown Formation	massive dolomite with thin, shaly interbeds
Mr	Metarhyolite	
Mb	Metabasalt	

125

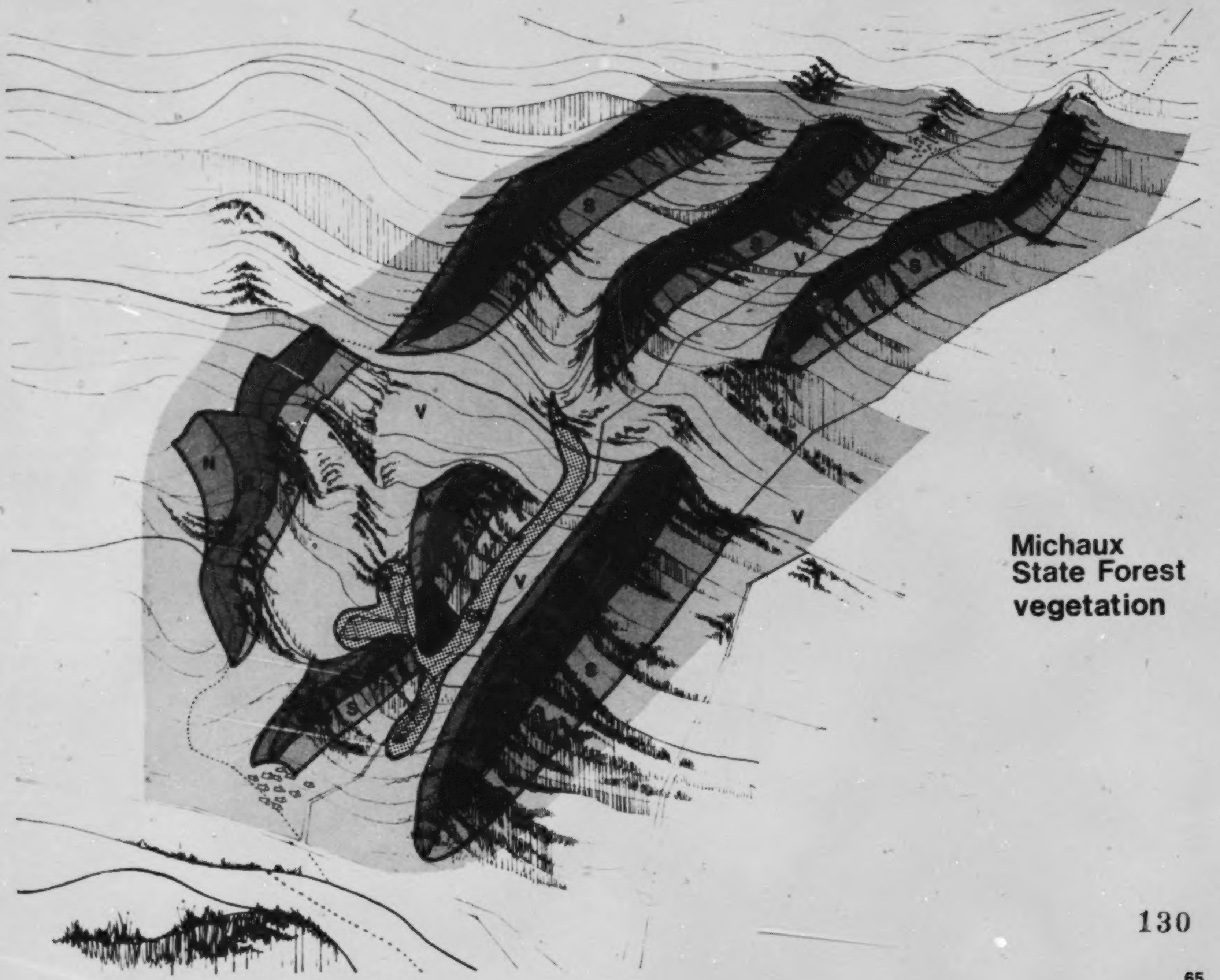

Mb
Cma
Cma
Mr
Mb
Ch
Cma
Mr
Cma
Ch
Ch

Michaux
State Forest
geology

127

126

R	Ridge Tops	red, black, white, scarlet, chestnut and bear oak; stunted growth; sandstone ridge tops the bear oak is dominant; also dwarf chestnut oak, sassafras, pitch pine and whitchhazel
N	Northern Slopes	mainly white oak; also chestnut, black, red and scarlet oak; scattered hemlock; understory sparce
S	Southern Slopes	scarlet oak and pine are dominant; also chestnut, white, black and red oak; understory--heaths and sweet ferns; understory sparce
G	Gaps	hemlock and red maple are dominant; also white pine, red oak, tulip trees, basswood, sweet birch, ash and hickory; understory--rhododendron; lush vegetation
V	Valley Floors	white oak dominant in non-cultivated areas; also tulip trees, red and black oaks, hickory and white pine; understory is the same
SE	Stream Edges	mixed mesophytic forest types--beech, Tilia heterophylla, Tilia neglecta, Acer saccharum, Quercus borealis, Quercus alba, Fraxinus americana; ferns and spring geophytes

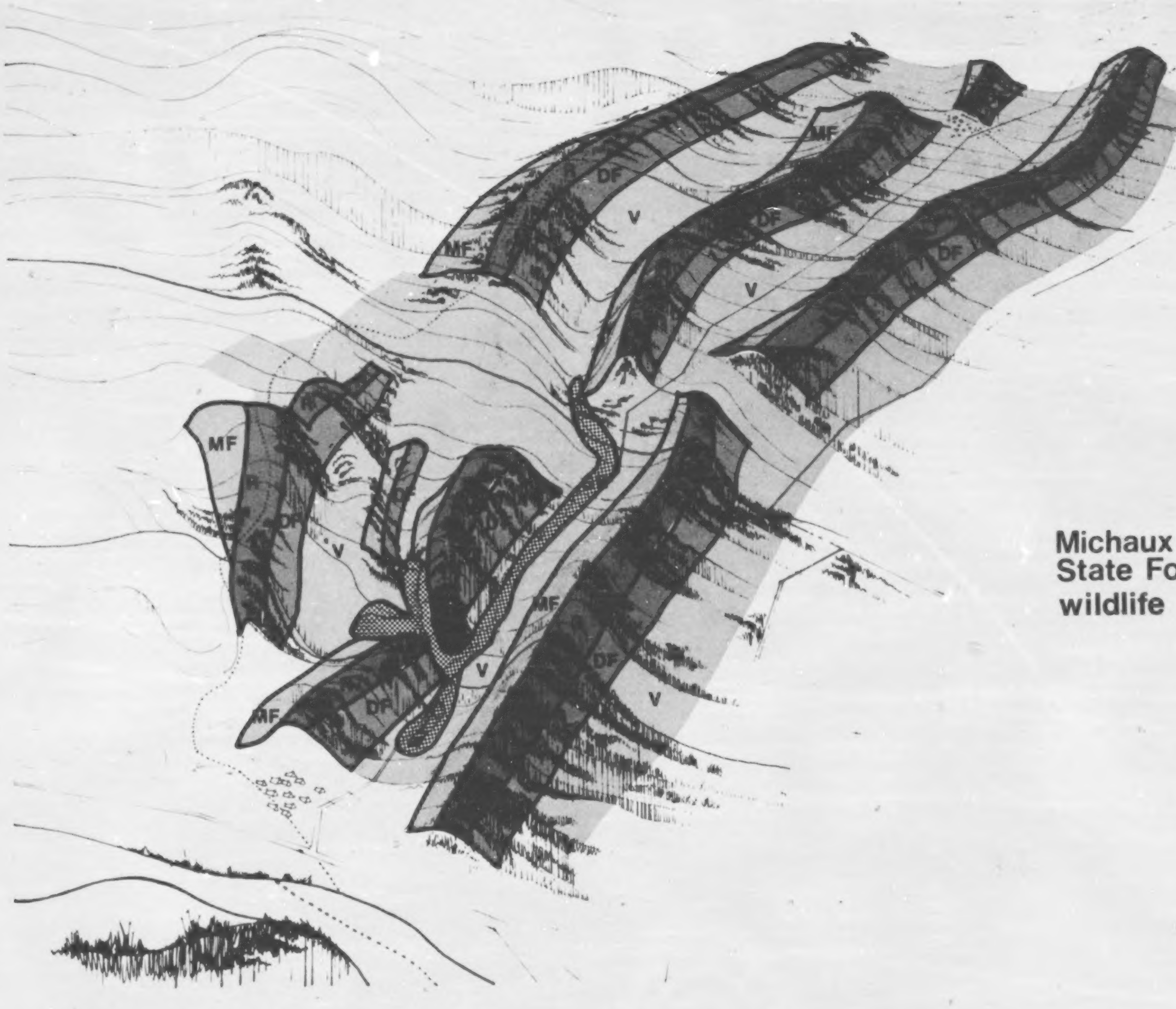

S
S
V
S
V
N
S
V
V
S
S

Michaux State Forest vegetation

130

129

R	Ridge Tops	almost barren of wildlife; few species of mammals--squirrels and other rodents; several species of birds
DF	Deciduous Forests	few species of mammals--mainly chipmunk, opossum and other rodents; large number of species of reptiles and birds
MF	Mixed Forests	variety of mammals--chipmunk and squirrel are dominant; several species of reptiles--wood turtle is dominant; variety of bird species--woodpecker, hawk and grouse are dominant
CP	Conifer/Pine	gap locations; few species of mammals--squirrel and snowshoe hare dominant; large variety of reptiles; many species of birds--woodpecker, hawks and grouse are dominant
V	Valleys	area rich in wildlife types; not only many species of birds, reptiles, amphibians and small mammals, but several of the large mammals--black bear, deer, skunks, raccoons and others
SE	Stream Edges	extremely rich in wildlife with many species of reptiles and amphibians as well as most bats and several other mammals--otter, mink, muskrats and rabbits
	Stream Beds	contain all species of fish, as well as an occasional beaver, otter or muskrat


MF
DF
V
MF
DF
V
MF
DF
MF
R
DF
V
MF
DF
V
MF
DF
V
R
R
DF

Michaux
State Forest
wildlife

133

132

1 **THADDEUS STEVENS BLACK SMITH SHOP**

2 **CALEDONIA STATE PARK**

3 **STEVENS FURNACE** was built by Thaddeus Stevens and several partners in 1876. It was soon abandoned in 1883; a partially reconstructed furnace remains.

4 **GRAFFENBURG INN** is located within Caledonia State Park on the Adams-Franklin County Line. The Inn was built in the mid-nineteenth century as a log tavern for turnpike travelers and later became a tavern for workers from the nearby iron furnaces. The Inn today is a large two-and-one-half-story brick structure, seven bays wide and three bays deep with a large frame addition to the rear.

5 **CHAMBERSBURG WATER SUPPLY RESERVOIR**

6 **LONG PINE RESERVOIR**

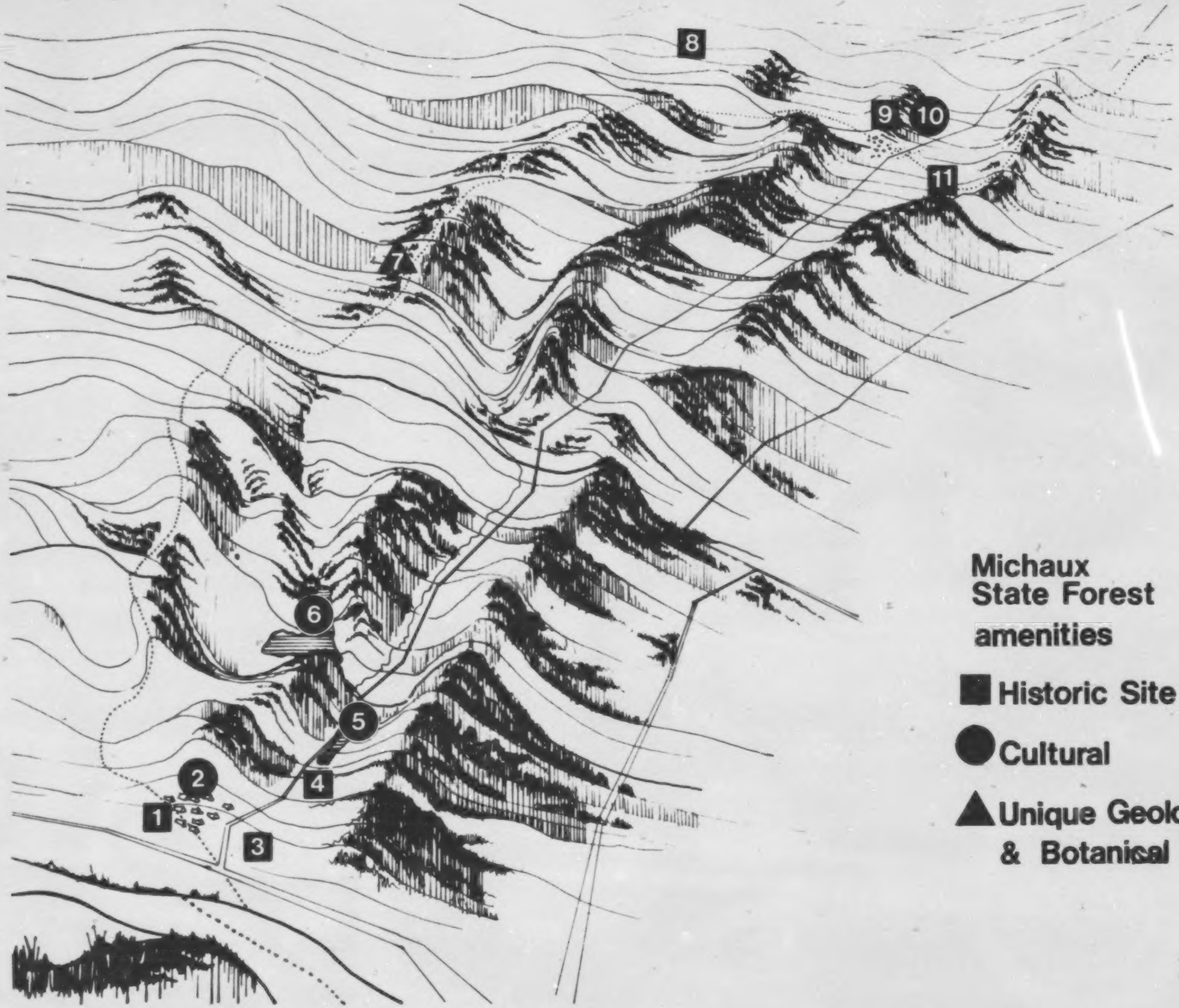
7 **TUMBLING RUN GAME PRESERVE**

8 **STONE HOUSE** is located near Walnut Bottom in South Newton Township. Built around 1800, it is a large six bay by three bay house with a long rear wing. There are cut stone lintels over all the windows.

9 **PINE GROVE FURNACE** is the site of a Pennsylvania state park. In 1782, Jacob Simeon built a small iron furnace and Pine Grove Furnace became the center for the manufacture of iron products, including tin plate stoves.

10 **PINE GROVE FURNACE MANSION** (Peter Ege House) was the mansion of the furnace master at Pine Grove Furnace. The mansion is constructed of brick and is particularly noteworthy for its fine interior woodwork.

11 **JOHN WRIGHT HOUSE** was built around 1750 with successive renovations in 1780, 1821, 1848-1849, and 1900. The original structure was a one-story stone house.


8
9
10
11
7
6
5
4
2
1
3

Michaux State Forest amenities

■ Historic Site

● Cultural

▲ Unique Geological & Botanical

Cumberland Valley

The Cumberland Valley is a large lowland area which is in close proximity to the expanding urban center of Harrisburg. Four major transportation ways link the area to important urban centers: 1. Interstate 81, 2. the Pennsylvania Turnpike, 3. the Caruise Pike, and 4. the Penn Central Railroad with subsidiary lines. These factors have brought developmental pressures to bear on the Appalachian Trail as it passes through the valley. Presently, strip development is widespread in the area. Land use projections plan for high density residential and commercial development. Within the entire national Appalachian Trail corridor, this section, passing through a major valley, is unique. Special consideration should be given to its design and protection.

The existing Trail route does not take advantage of the best qualities of the Cumberland Valley. Mechanicsburg and Carlisle are rich in historic quality. A combination of Appalachian Trail rerouting and a town loop system could provide better access to historic environments.

ALTERNATIVE 1

This solution utilizes a railroad grade as the primary Trail route with land along the Conodoguinet Creek serving as a minor linkage. The routing is direct, and it provides a potential for access to the Mechanicsburg historic sites.

ALTERNATIVE 2

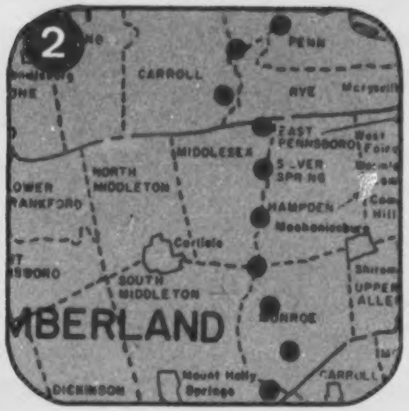
To avoid roads with strip development, the Appalachian Trail is routed along Stony Ridge. The ridge is the only natural vertical element encountered in the Cumberland Valley.

ALTERNATIVE 3

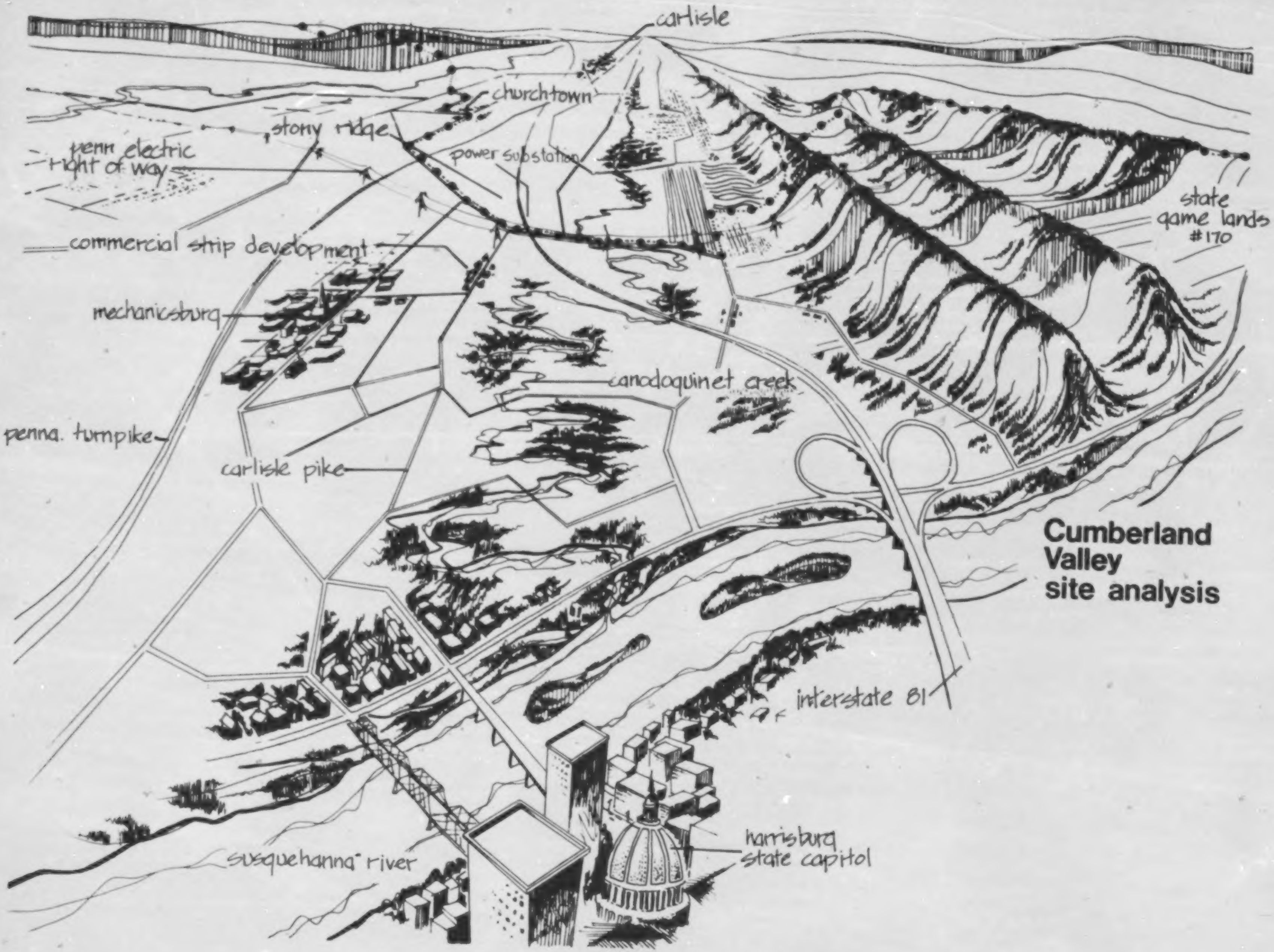
This alternative utilizes land along Conodoguinet Creek as its primary route with a railroad grade used as a minor linkage. The strongest advantage is the potential for access to Carlisle historic sites.

ALTERNATIVE 4

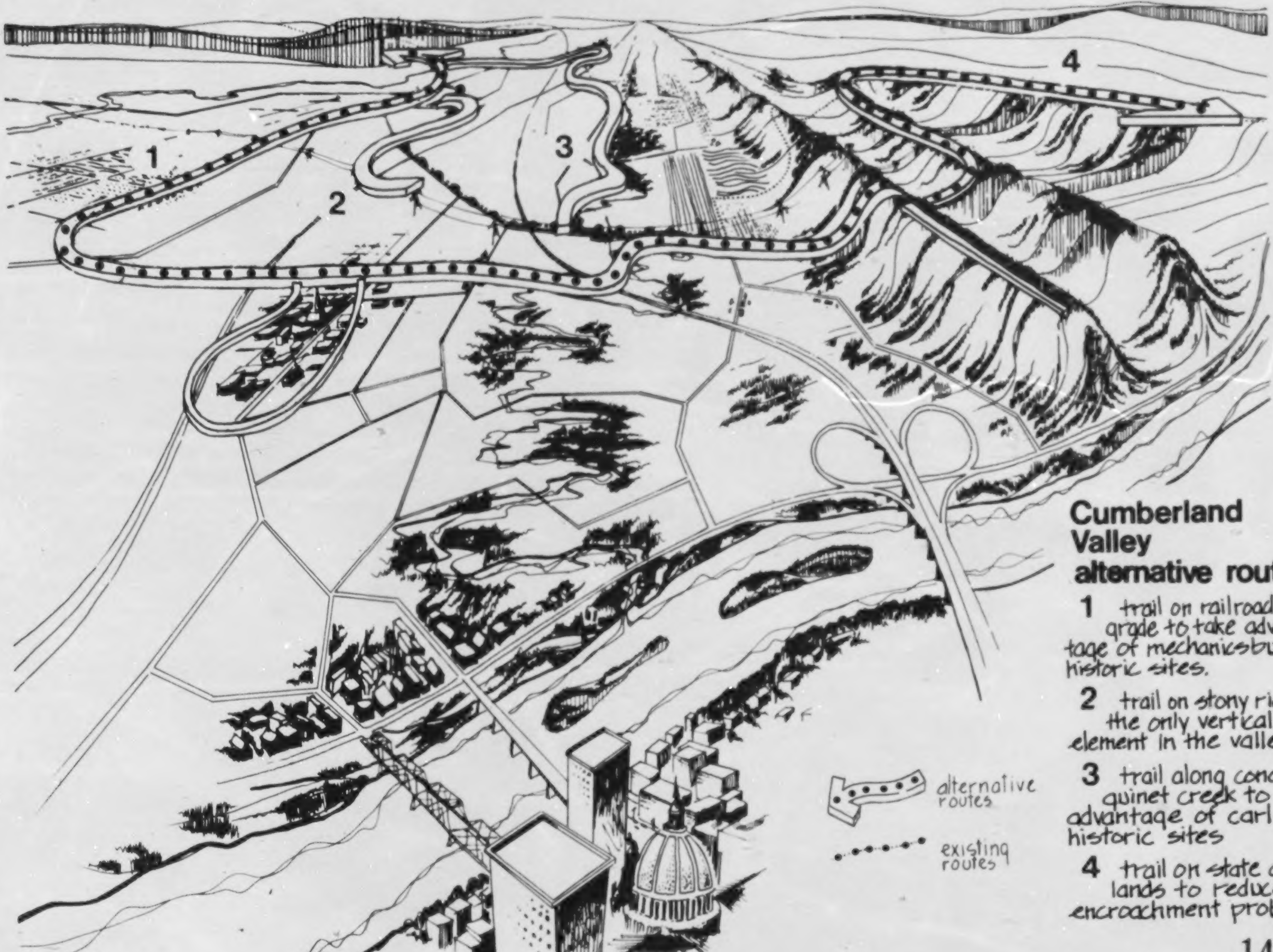
By shifting the Trail to the position shown, it can be located almost entirely in State Game Lands. This would alleviate pressures from private lands, and insure the preservation of the Appalachian Trail. The possibility of a loop trail to the point of Blue Mountain works well with this alternative.



p. 70 blank


carlisle
churchtown
stony ridge
penn electric right of way
power substation
state game lands #170
commercial strip development
mechanicsburg
canodoquinet creek
penna. turnpike
carlisle pike
interstate 81
harrisburg state capitol
susquehanna river

Cumberland Valley site analysis


4
1
3
2
alternative routes
existing routes
AF

Cumberland Valley alternative routes

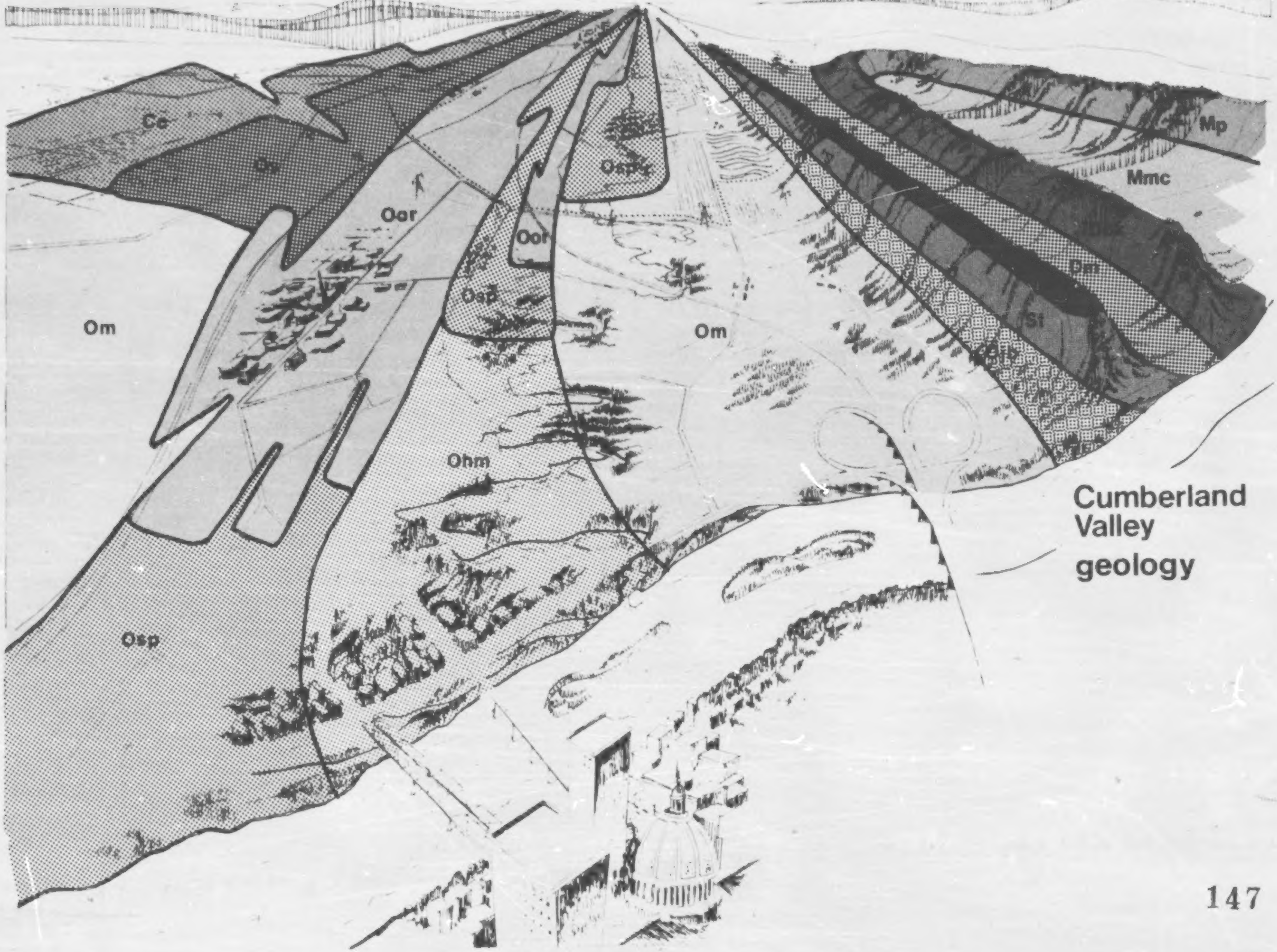
1 trail on railroad grade to take advantage of mechanicsburg historic sites.

2 trail on stony ridge, the only vertical element in the valley.

3 trail along conodoquinet creek to take advantage of carlisle historic sites

4 trail on state game lands to reduce encroachment problem.

Os	Stonehenge	bluish gray, finely crystalline limestone and dark gray laminated limestone with abundant "edgewise" conglomerate
	Larke	dark, coarsely crystalline dolomite; equivalent to Stonehenge
Oor	Ontelaunee Formation	very fine to medium crystalline dolomite with interbeds of bluish gray limestone interbedded and nodular dark gray chert at base
	Epler Formation	very fine crystalline, bluish gray limestone interbedded with gray dolomite; coarse crystalline limestone lenses present
	Rickenbach Formation	gray, very fine to coarse crystalline, laminated dolomite; dark gray chert in irregular beds, stringers and nodules; bands of quartz sand grains in lower half
Osp	St. Paul Formation	magnesian limestone containing numerous layers of blocky chert
Ohm	Hershey Formation	dark gray to black, thin bedded, argillaceous limestone
	Myerstown Formation	medium to dark gray, platy medium crystalline limestone, carbonaceous at base
Ojb	Juniata Formation	red, fine grained to conglomerate quartzitic sandstone with well developed cross-bedding and with interbedded red shale in places
	Bald Eagle Formation	gray to greenish gray, fine grained to conglomeratic, thick bedded sandstone; some greenish gray shale in places
	Reedsville Formation	dark gray, olive weathering shale with thin silty to sandy interbeds; black shale at base
St	Tuscarora Formation	white to gray, medium to thick bedded, fine grained, quartzitic sandstone; conglomeratic in parts
Sc	Clinton Group - Rose Hill Formation	reddish purple to greenish gray, thin to medium bedded, fossiliferous shale with intertonguing "iron sandstones" and local gray, fossiliferous limestone
Dm	Marine Beds	gray to olive brown shales, graywackes and sandstones; contains "Chemung" beds and "Portage" beds
Cc	Conococheague Group	gray limestone with siliceous and argillaceous bands and laminae and dark to light gray dolomite; sandy in lower part

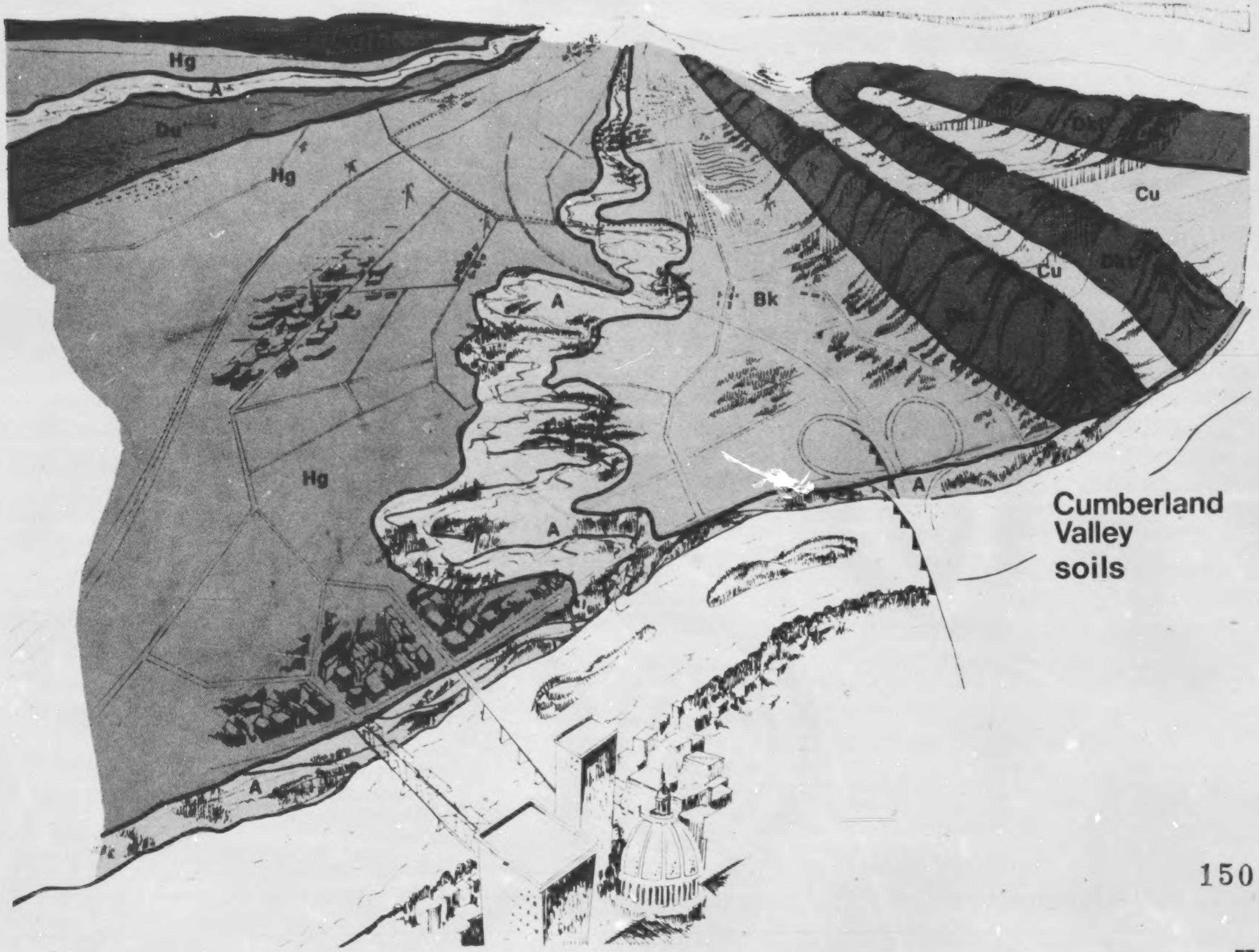

Cc
Oor
Oor
Osp
Om
Om
Ohm
Osp
St
Mp
Mmc

Cumberland Valley geology

147

146

Dkt	Appalachian Dekalb-Lehew-Laidig	good drainage, yellowish gray with grayish yellow to brown sub-soil, slope range 15-45%, average slope 25%, stony sandy loam, residual to semi-residual, geologic source--gray and brown acid sandstones, location--Appalachian mountain ridges
Cu	Calvin Ungers	good drainage, reddish brown, slope range 3-18%, average slope 8%, silt loam (shaly silt loam), geologic source--reddish brown Catskill Mauch Chunk silty shales, location--Appalachian Valleys, South Central, PA
Bk	Berks	good drainage, dark grayish brown with yellowish dark gray sub-soil, slope range 15-35%, average slope 20%, silt loam (shaly silt loam), residual, geologic source--dark gray silty Martinsburg neutral shales, location--Cumberland, Lebanon and Lehigh Valleys
Du	Duffield	good drainage, yellowish brown with brownish yellow sub-soil, slope range 2-15%, average slope 5%, silt loam (silty clay loam), residual, geologic source--silt laminated limestones, location--Limestone valleys and uplands
Hg	Hagerstown	good drainage, reddish brown with reddish brown to brown sub-soil, slope range 0-10%, average slope 3%, silt loam (aggregated silty clay), residual, geologic source--bluish gray high calcium limestones, location--Limestone valleys and uplands
A	Alluvial Flood Plain	fair to poor drainage, brown to gray, slope range 0-5%, average slope 2%, silty to sandy, alluvial floodplain deposits, geologic source--yellowish gray acid sandstones and shales, location--Alluvial Flood Plain

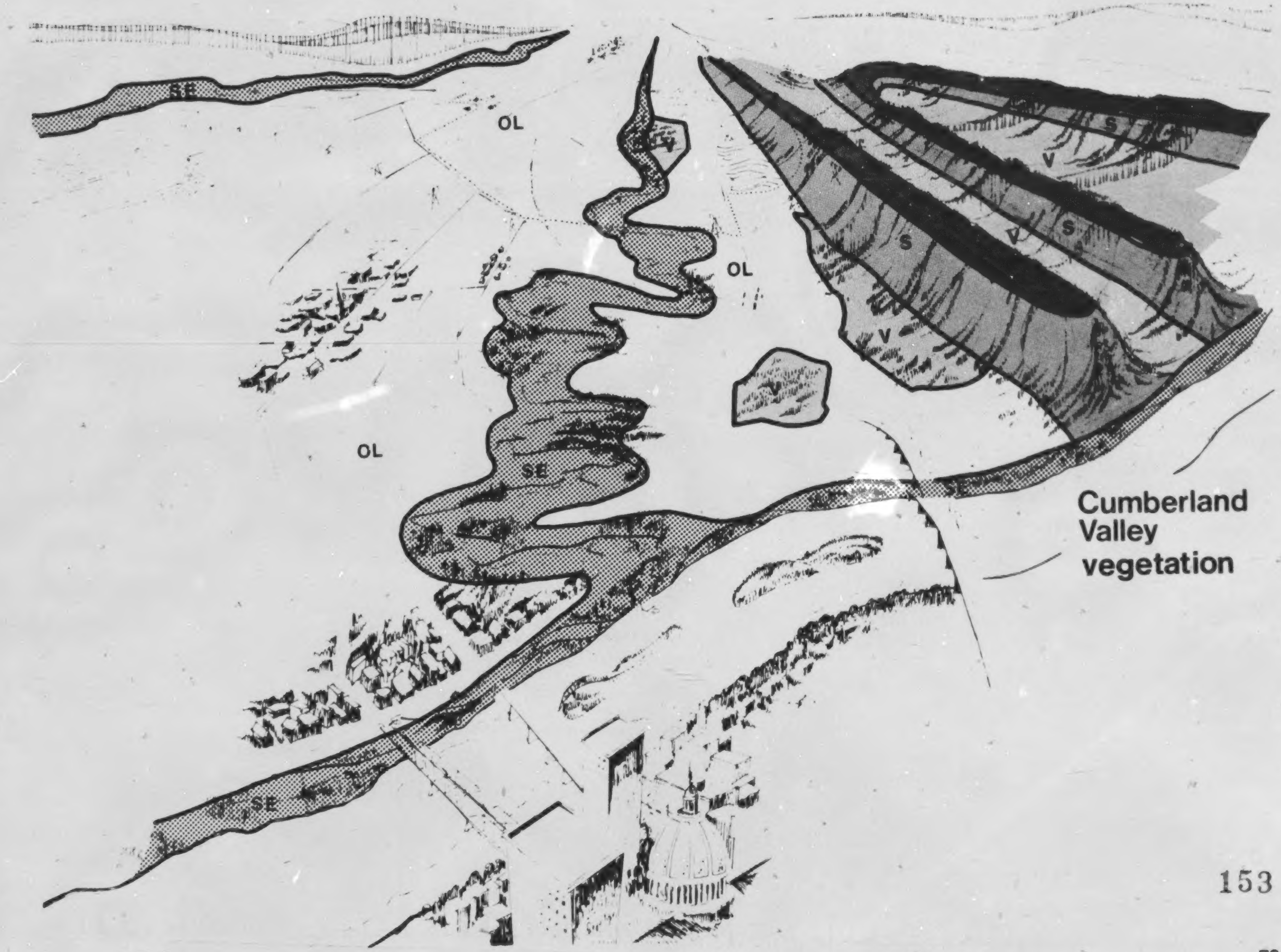

Hg
A
Du
Hg
Dk
Cu
A
Bk
Cu
Dk
Hg
A
A
A

Cumberland Valley soils

150

149

R	Ridge Tops	red, black, white, scarlet, chestnut and bear oak; stunted growth; sandstone ridge tops the bear oak is dominant; also dwarf chestnut oak, sassafras, pitch pine and whitchhazel
S	Southern Slopes	scarlet oak and pine are dominant; also chestnut, white, black and red oak; understory--heaths and sweet fern; understory sparce
V	Valley Floors	white oak dominant in non-cultuvated areas; also tulip trees, red and black oaks; hickory and white pine; understory is the same
SE	Stream Edges	mixed mesophytic forest types--beech, Tilia heterophylla, Tilia neglecta, Acer saccharum, Quercus borealis, Quercus alba, Fraxinus americana; ferns and spring geophytes
OL	Open Land	same as stream edges; also urbanized areas

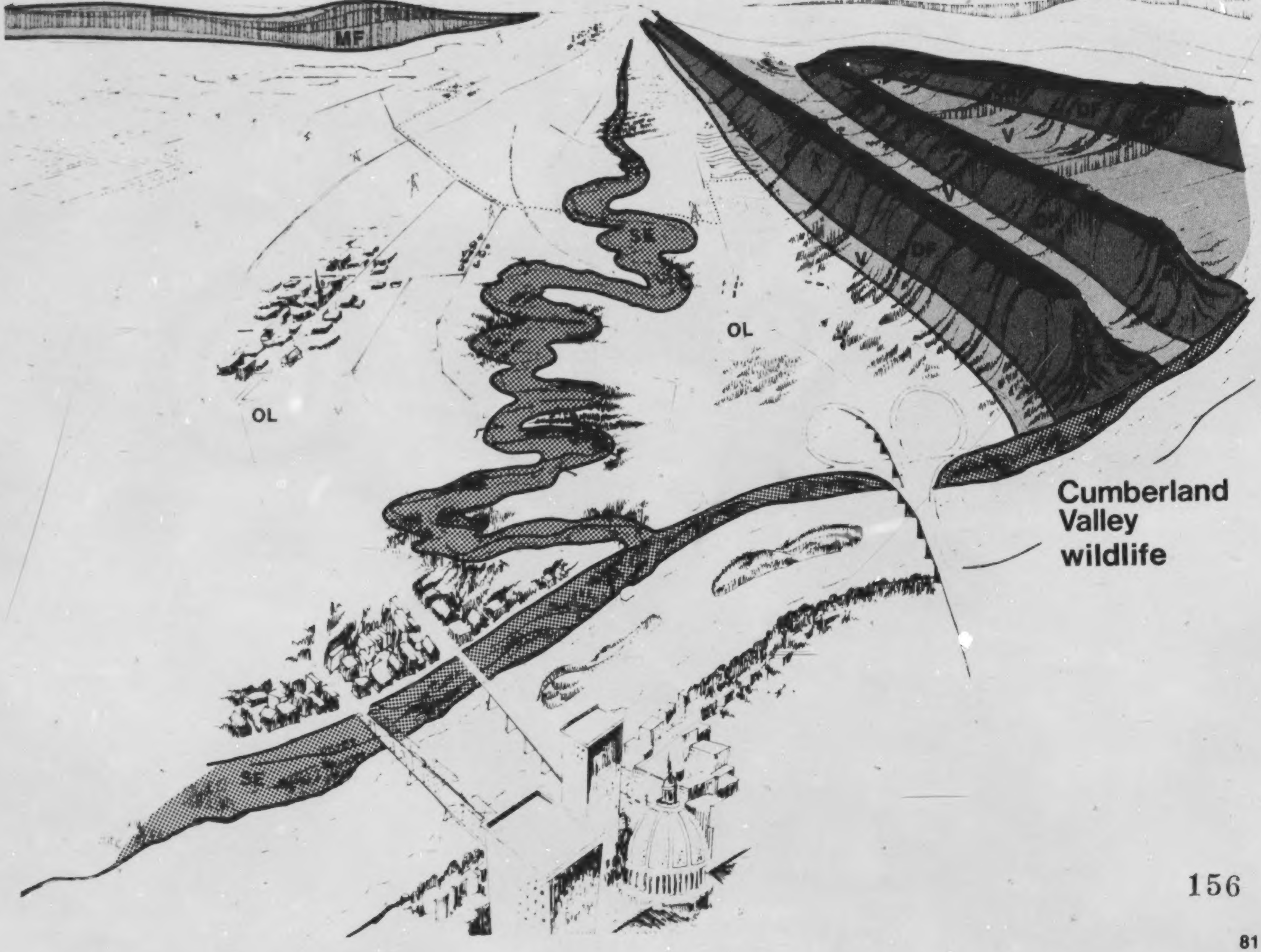

SE
OL
V
OL
S
V
S
V
S
V
V
OL
SE
SE
SE

Cumberland Valley vegetation

153

152

R	Ridge Tops	almost barren of wildlife; with only a few species of mammals--squirrels and other rodents; several species of birds
DF	Deciduous Forests	few species of mammals--mainly chipmunk, opossum and other rodents; large number of species of reptiles and birds
MF	Mixed Forests	variety of mammals--chipmunk and squirrel are dominant; several species of reptiles--wood turtle is dominant; variety of bird species--woodpecker, hawk and grouse are dominant
V	Valleys	area much richer in wildlife types; not only many species of birds, reptiles, amphibians and small mammals, but also several of the large mammals--black bear, deer, skunks, raccoons and others
SE	Stream Edges	extremely rich in wildlife with many species of reptiles and amphibians as well as most bats and several other mammals otter, mink, muskrats and rabbits
	Stream Beds	contain all species of fish, as well as an occasional beaver, otter or muskrat
OL	Open/Agriculture	large variety of mammals--shrew, cottontail, red fox and small rodents dominant; limited species of reptiles--snakes; variety of birds--starling, hawk and ring-necked pheasant dominate


MF
OL
SE
OL
V
DF
V
DF
V
DF
DF
V
SE

Cumberland Valley wildlife

1 CARLISLE BARRACKS is the second oldest army post in the United States. A powder magazine erected in 1777 still stands along with the old Hessian guard house from the revolutionary war. This is also the former site of the Carlisle Indian school in operation from 1819-1918. The school gave thousands of Indians an elementary education and practical instruction in mechanical arts, agriculture and home economics. A notable graduate was athlete Jim Thorpe. The few surviving buildings are now incorporated into the U.S. Army war college.

2 FIRST PRESBYTERIAN CHURCH, Carlisle Square. Carlisle is a large stone church designed by Robert Smith and built in 1769. This church was the site of a July 17, 1774 meeting establishing the local committee of correspondence in response to the closing of the Port of Boston. Additionally, in May 1776, it was the site of a meeting of the state assembly considering separation from England.

3 BLAINE HOUSE in Carlisle, was built in 1792. It is a two-story brick house with an old stone tavern incorporated into a rear wing. The house provides an excellent example of ornate woodwork.

4 JAMES WILSON's LAW OFFICE is located on West High Street, Carlisle and was built from 1770 to 1778. James Wilson was a signer of the Declaration of Independence and one of the framers of the U.S. Constitution.

5 DICKINSON SCHOOL OF LAW is the oldest law school in Pennsylvania founded in 1834 by John Reed, an eminent jurist.

6 OLD WEST is located on the campus of Dickinson College in Carlisle and was built from 1804 to 1822. The U-shaped stone building, designed by Benjamin Latrobe, features a large entrance gable with double door, sidelights and a very large fan light. Round brick arches are found above the windows and the building is topped by a small belfry cupola.

7 MOLLY PITCHER'S GRAVE is found in a small cemetery on South Hanover Street, Carlisle. Mary Hays McCauley, known as Molly Pitcher, was the heroine of the Battle of Monmouth at which she carried water to the fighting men.

8 FORT WASHINGTON (FORT COUCH) was in a line of breastworks dug in 1863 to protect the militia defending the river bridges from the confederate invasion threat.

9 PEACE CHURCH is located at the intersection of trindle and St. John's road in Camp Hill. The church was built in 1798 and is a two-and-one-half-story limestone building with two rows of rectangular 12 over 12 windows. Completely unaltered, the church contains all of its original appointments including an 1806 doll organ. The Confederate Army in 1863 utilized the site for an artillery battery shelling the outer defenses of Harrisburg.

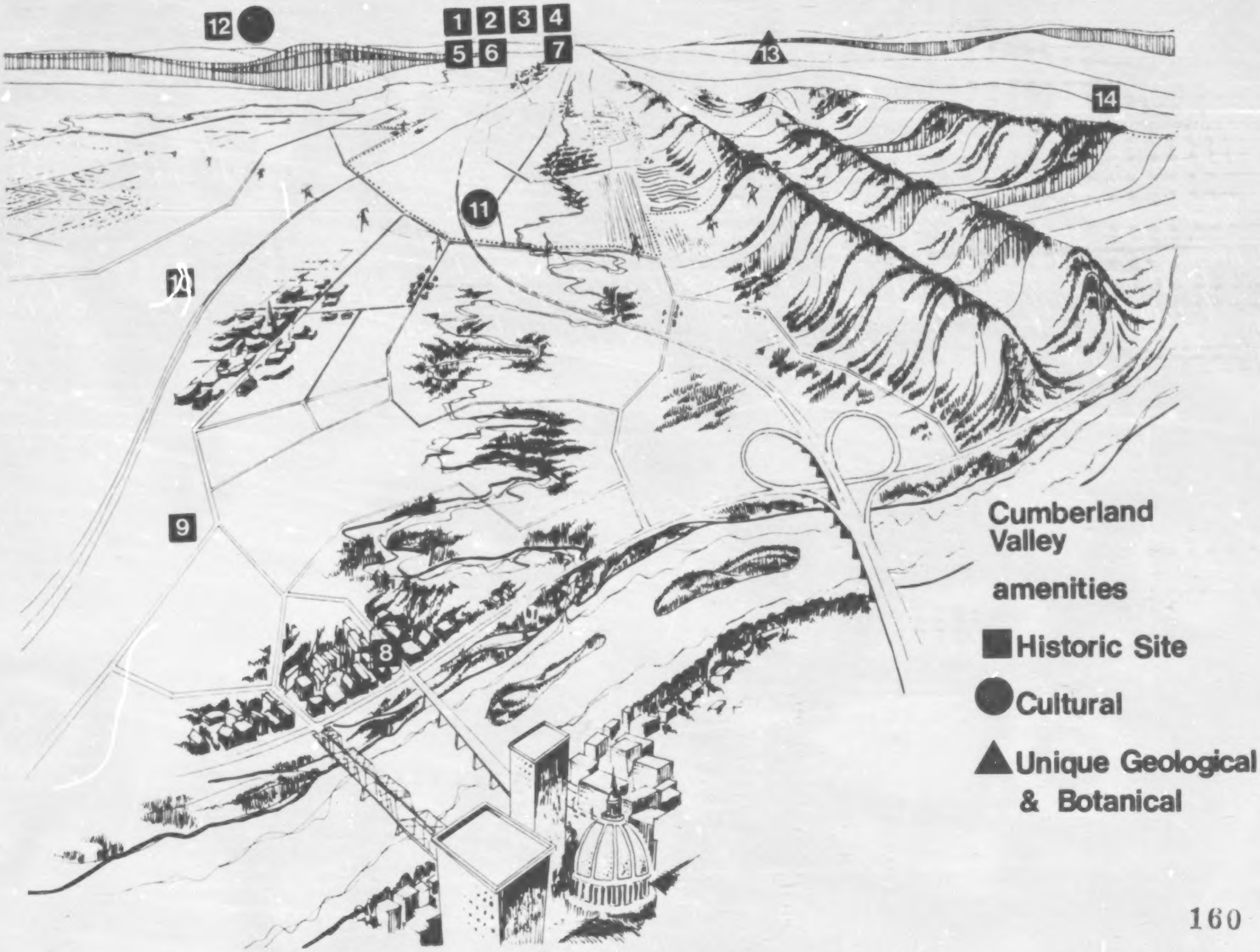
10 PENNSYLVANIA TURNPIKE

11 CARLISLE-HARRISBURG PIKE, the "Great Road" was originally surveyed and cut in 1744 from Shippensburg to the Susquehanna River. It was extended at a later date to the Potomac River. Prior to the Pike's construction, the "Allegheny Path," an old Indian trail, was the main transportation route.

12 PINE GROVE FURNACE (See Michaux State Forest Map)

13 BOX HUCKLEBERRY. This ancient plant, estimated to be nearly 13,000 years old, is located on two sites within the area. One site is south of New Bloomfield and the other is at Amity Hall. The plant is extremely rare and received national attention as one of the last examples of the ancient plant world.

14 DELLVILLE BRIDGE is an excellent example of a covered wooden bridge, at one time predominant in the area.


12
1
2
3
4
5
6
7
13
14
11
10
9
8
Cumberland Valley
amenities
■ Historic Site
● Cultural
▲ Unique Geological & Botanical

Saint Anthony's Wilderness

Stony Creek Valley and the surrounding area comprise the Saint Anthony's Wilderness. The valley is located not more than 10 miles from downtown Harrisburg. The area is contained within State Game Lands No. 211.

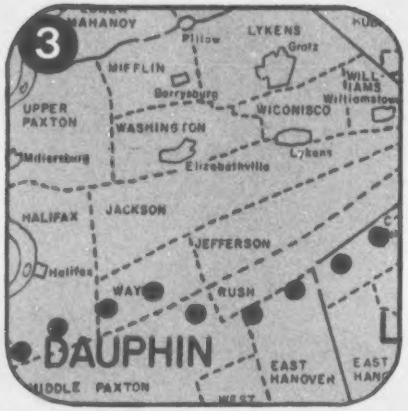
The uniqueness of the area lies in the close proximity of wilderness character to a large urban center. The wilderness is presently free of physical, visual, or audible inroads. Most of the trees, however, are immature secondary growth due to extensive lumbering 50 years ago.

Saint Anthony's Wilderness is also rich in unique historic and natural features. Found among the trees are ruins of old mining towns dating back to the 1800's. Nestled between Sharp and Stony Mountains is the "Devil's Race Course." The course, a massive field of boulders, fans out over a flowing stream obscuring it almost completely from sight.

The proposed construction of a pump storage facility in Stony Valley threatens Saint Anthony's Wilderness. The unit involves the construction of two dams, one located on Stony Creek, and the other situated just west of Devil's Race Course between Sharp and Stony mountains. Besides the environmental impact, the facility would destroy the "wilderness experience" of the area.

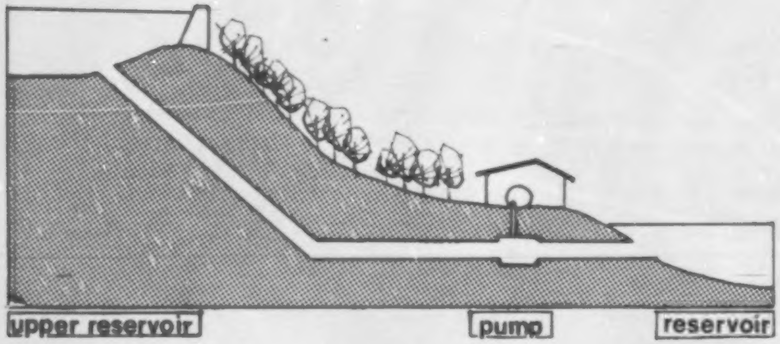
Another consideration is the present routing of the Appalachian Trail through Saint Anthony's Wilderness. The Trail is routed by an area rich in historic and natural features, yet it remains on top of the ridge--taking little advantage of the opportunities offered by the diverse wilderness environment.

Also, a natural area of this size and quality near a large urban center is a unique recreational opportunity. Therefore, "loop" trail systems could be developed to accommodate the short trip hiker, and to ease the stress suffered by the Appalachian Trail


3
MAHANOY
Pillow
LYKENS
Gratz
MIFFLIN
Berrysburg
WILLIAMS
Williamstown
UPPER PAXTON
WASHINGTON
WICONISCO
Millersburg
Elizabethville
Lykens
HALIFAX
JACKSON
JEFFERSON
Halifax
WAY
RUSH
DAUPHIN
EAST HANOVER
EAST HAN
IDDLE PAXTON
WEST

p. 84 blank

PROBLEM: PUMP STORAGE

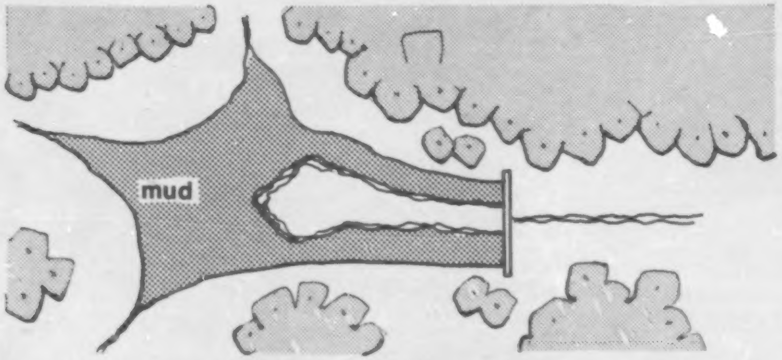


pump storage is a method for storing energy for the production of electricity during peak demand periods.

during low demand periods (ex.-night) when there is energy to spare, water is pumped from the lower reservoir into the upper one

then, during peak demand periods, the water is allowed to flow back downhill, through turbines, producing the needed power.

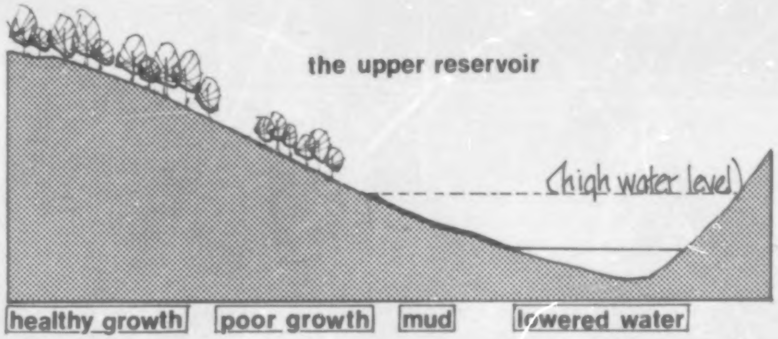
because of friction losses for every three units of energy stored only two units are recoverable. Pump storage advocates contend this 33% loss is preferable in meeting peak demand over alternatives such as building conventional types of additional generating capacity or peak load pricing.

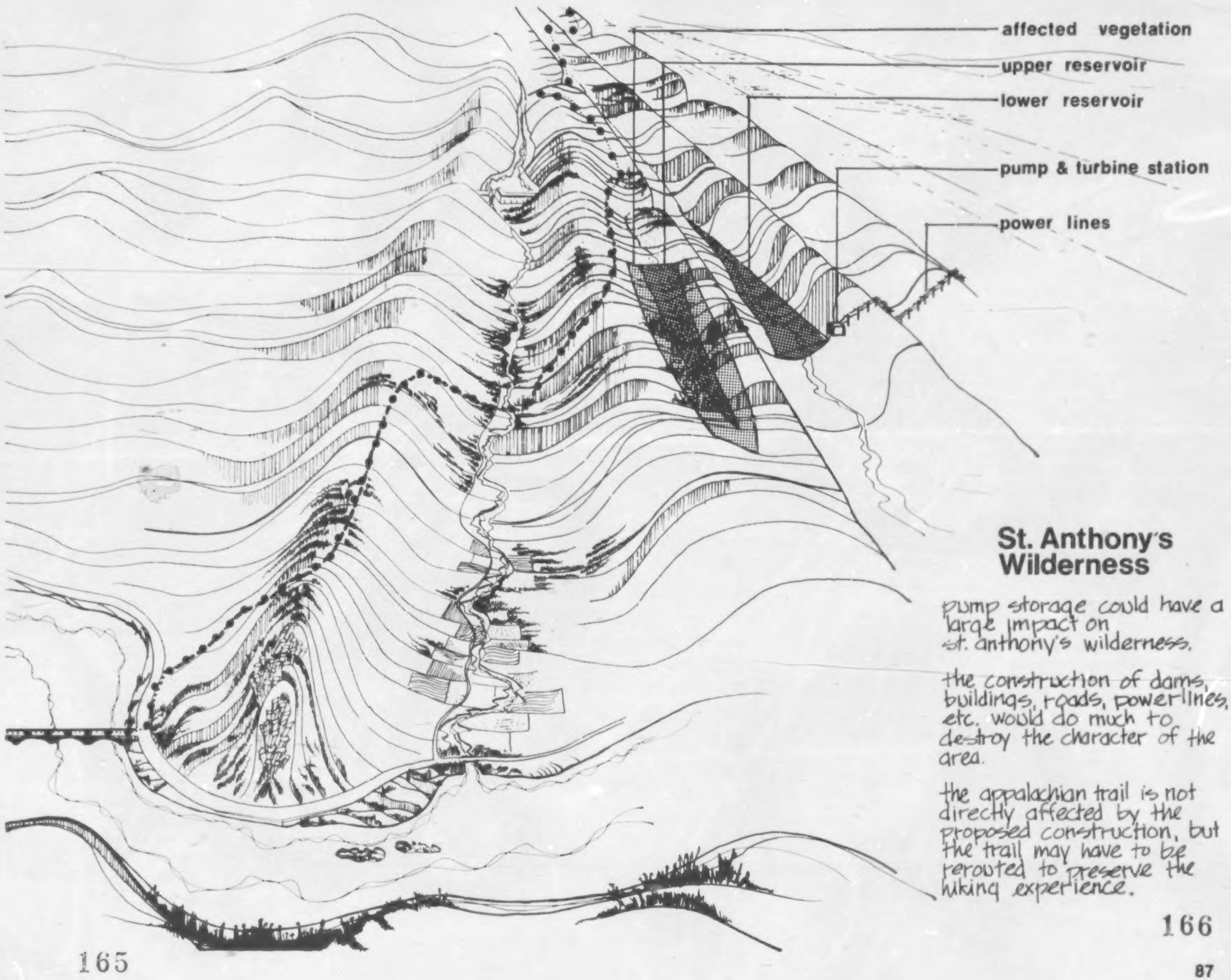


besides the visual disruption of a large reservoir, power lines, etc., the construction of a pump storage facility has another important ecological impact and aesthetic impact

since the water level of each reservoir will be constantly fluctuating, there will often be large banks of mud left around each reservoir when it's water is lowered.

the constant fluctuation will also put a great deal of stress on the vegetation near the reservoirs, probably resulting in an extensive area of poor quality growth.




affected vegetation
upper reservoir
lower reservoir
pump & turbine station
power lines

St. Anthony's Wilderness

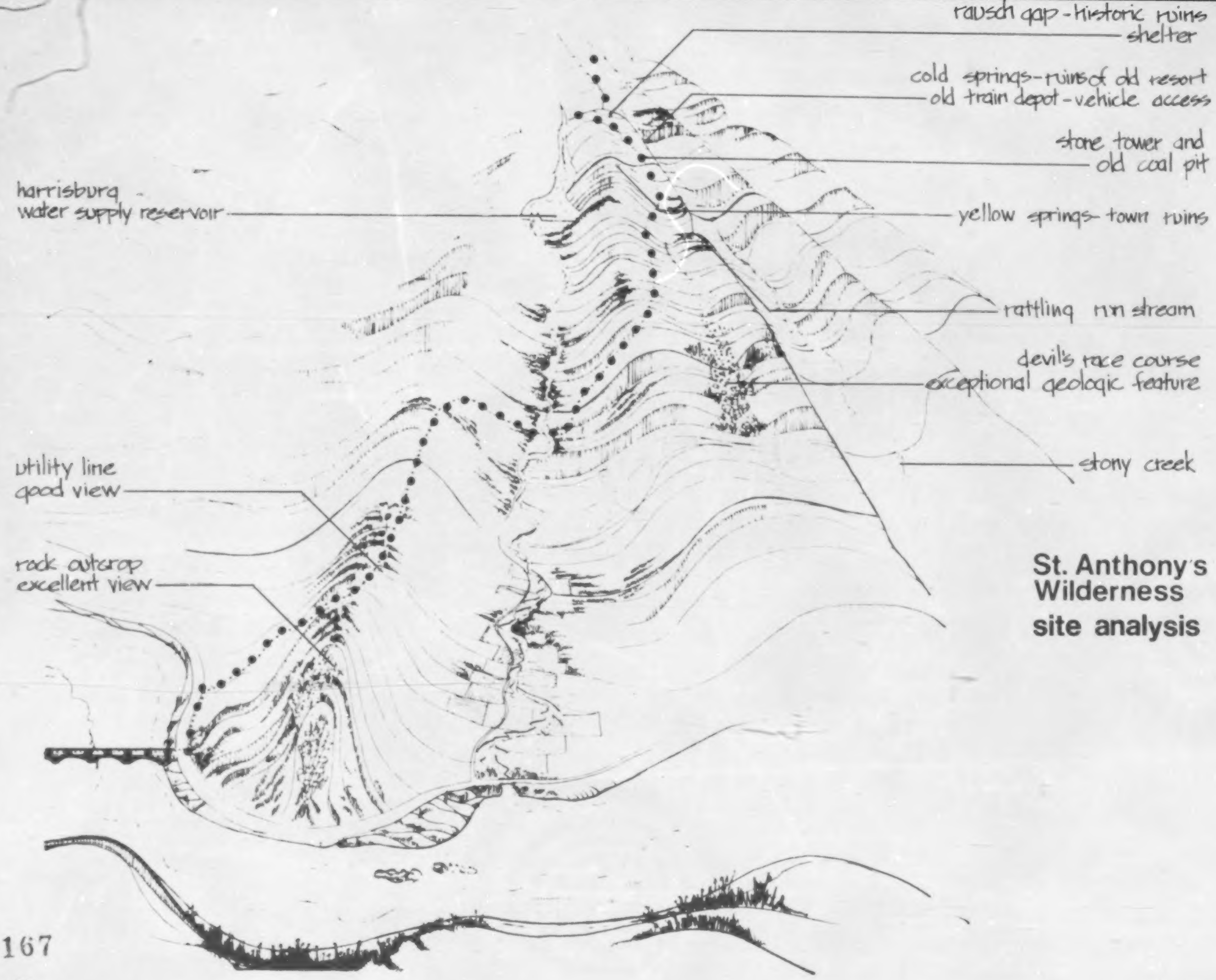
pump storage could have a large impact on st. anthony's wilderness.

the construction of dams, buildings, roads, powerlines, etc. would do much to destroy the character of the area.

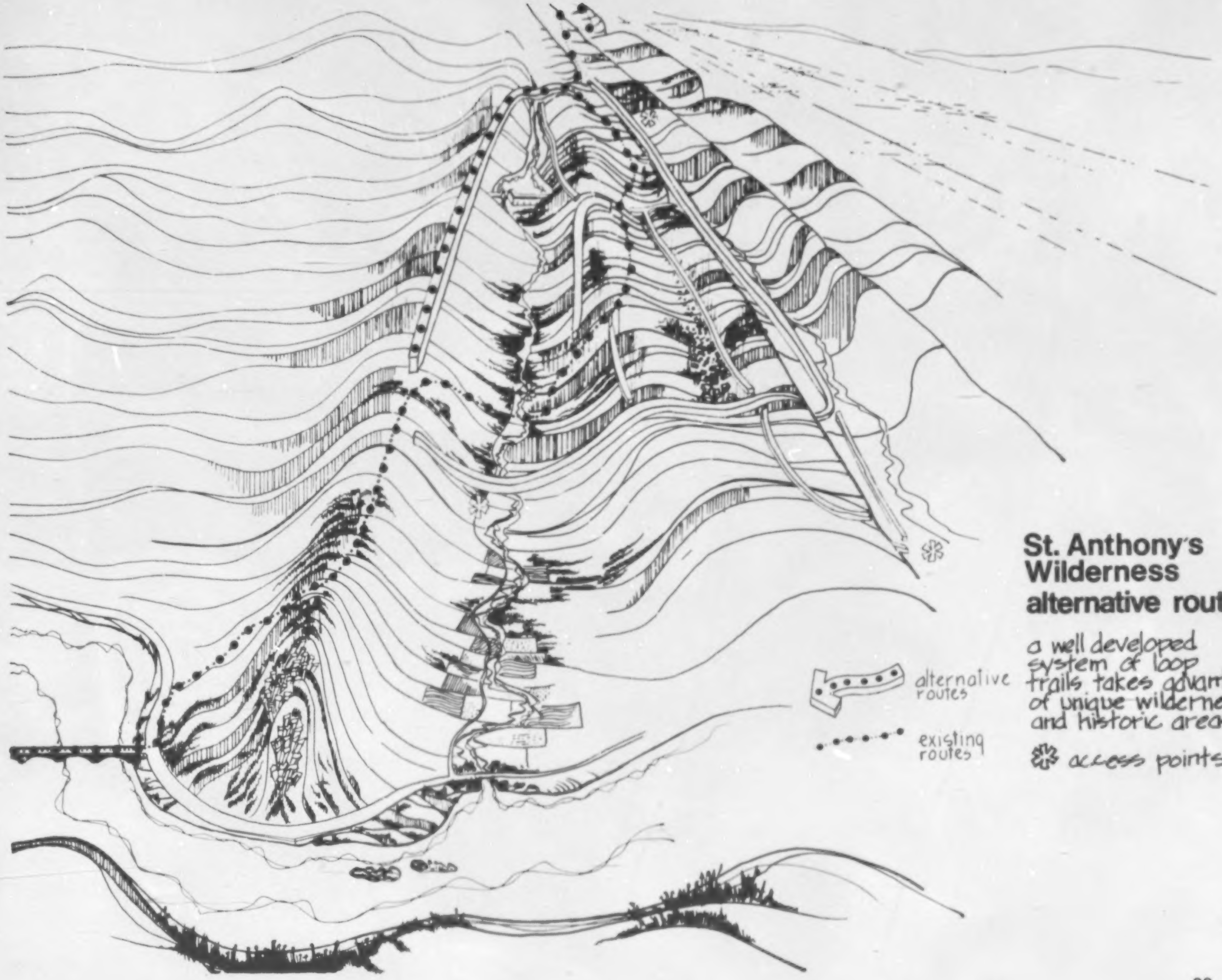
the appalachian trail is not directly affected by the proposed construction, but the trail may have to be rerouted to preserve the hiking experience.

165

166


rausch gap - historic ruins
shelter
cold springs - ruins of old resort
old train depot - vehicle access
stone tower and
old coal pit
harrisburg -
water supply reservoir
yellow springs - town ruins
rattling run stream
devil's race course
exceptional geologic feature
stony creek
utility line
good view
rock outcrop
excellent view

St. Anthony's Wilderness
site analysis

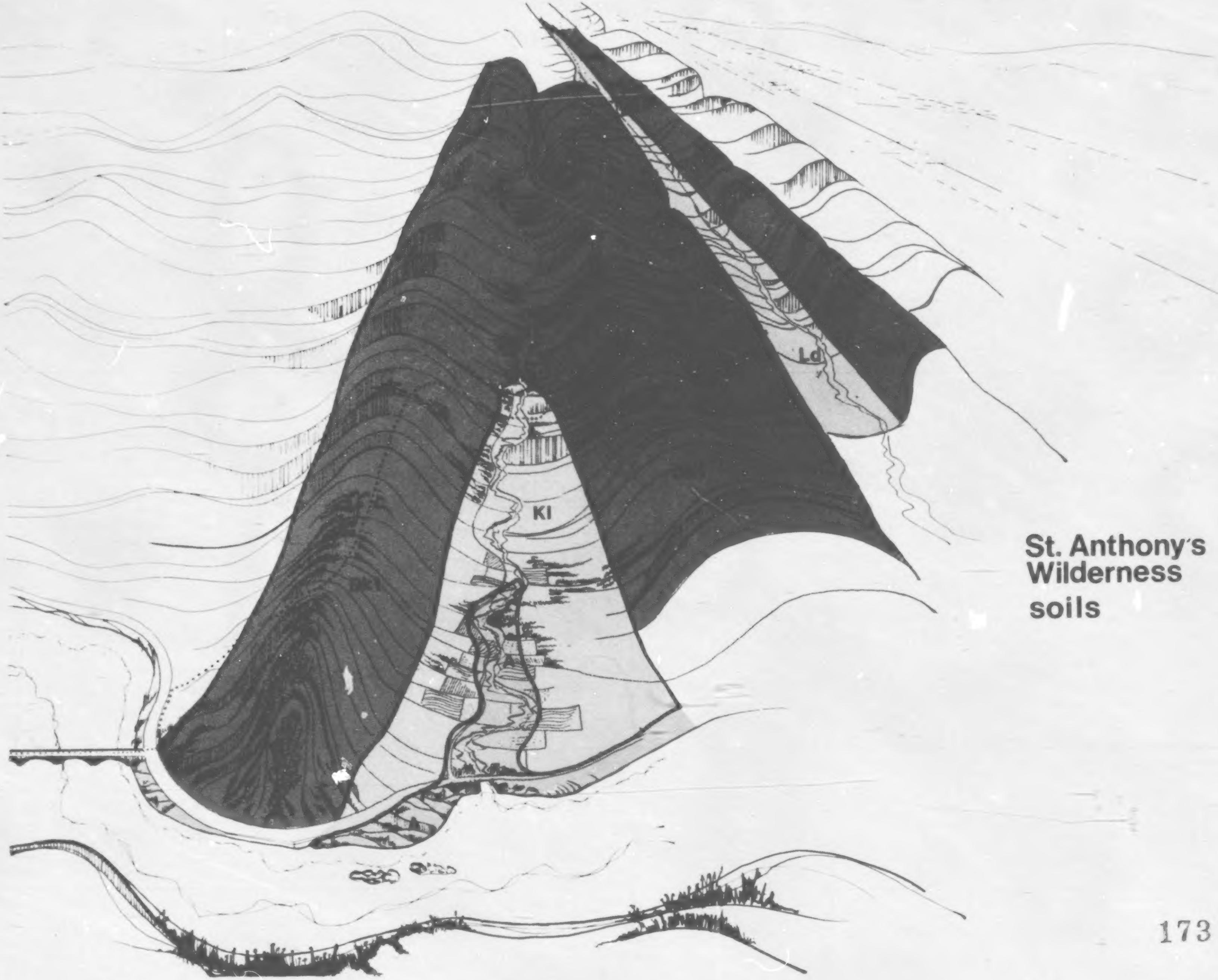

alternative routes
existing routes

St. Anthony's Wilderness alternative routes

a well developed system of loop trails takes advantage of unique wilderness and historic areas

✻ access points

Dkt	Appalachian Dekalb-Lehew-Laidig	good drainage, yellowish gray with grayish yellow to brown sub-soil, slope range 15-45%, average slope 25%, stony sandy loam--residual to semi-residual, geologic source--gray and brown acid sandstones, location--Appalachian mountain ridges
Kl	Klinesville	poor drainage, brown to gray, slope range 0-5%, average slope 2%, silty to sandy--alluvial flood plain deposits, geologic source--red acid shale, location--Alluvial Flood Plain
Ld	Laidig Buchanon	good to fair drainage, permafrost colluvium, grayish brown with brownish yellow sub-soil, slope range 15-40%, average slope 20%, stony sandy loam (stony silt loam), geologic source--yellowish to brownish gray acid shales and hard sandstones, location--Appalachian Valley areas, South Central PA
A	Alluvial Flood Plains	fair to poor drainage, brown to gray, slope range 0-5%, average slope 2%, silty to sandy, geologic source--yellowish gray acid sandstones and shales, location--Alluvial Flood Plain

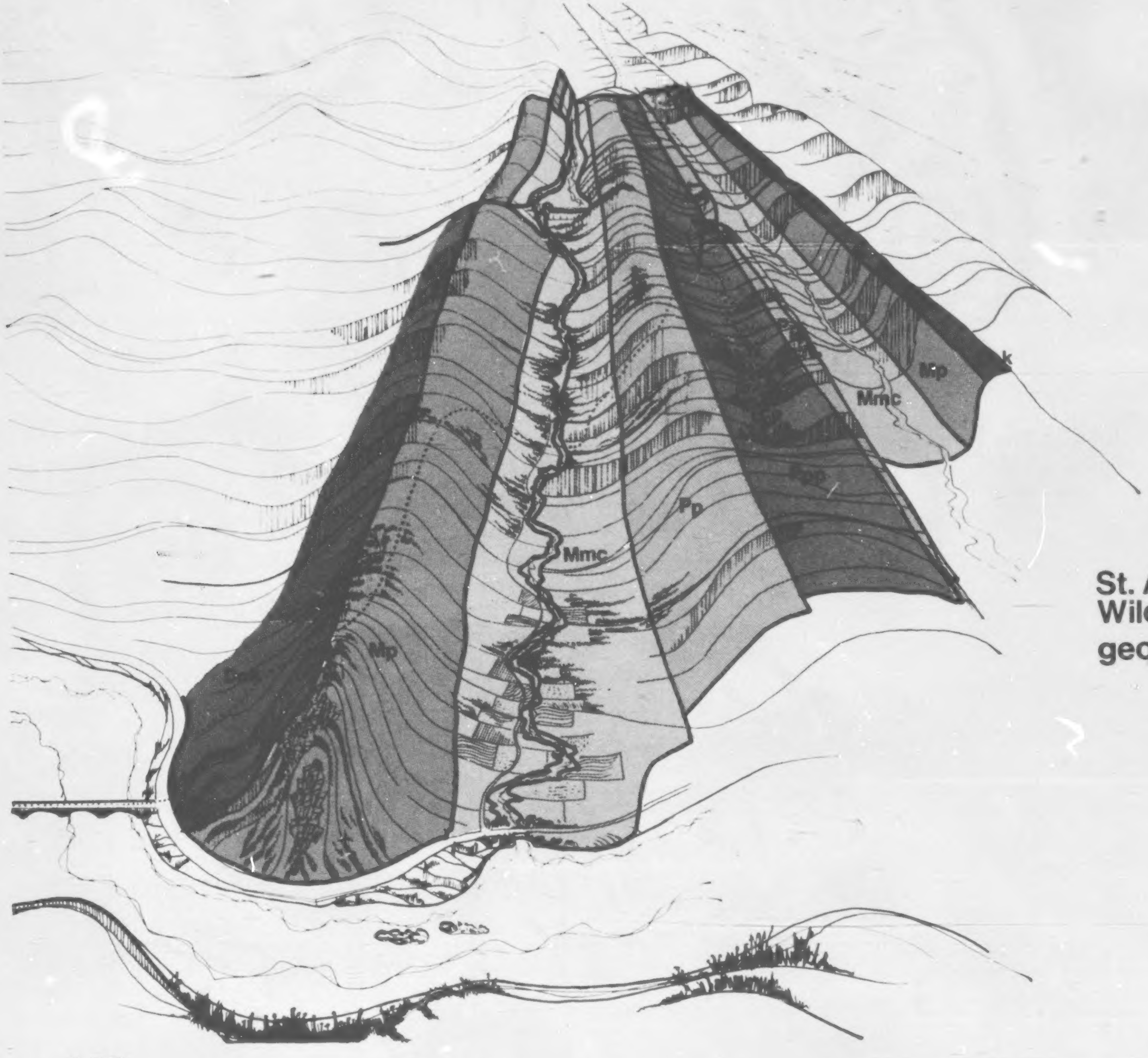


St. Anthony's Wilderness soils

173

172

Ppp	Permian - Post Pottsville Formation	brown or gray sandstone and shale with some conglomerate and numerous mineable coal
Pp	Permian - Pottsville Group	light gray to white coarse grained sandstone and conglomerate; some mineable coal
Mmc	Mauch Chunk Formation	red shales with brown to greenish gray, flaggy sandstones; streams easily cut through the soft shales found in the valleys
Mp	Pocono Group	predominantly hard, gray, massive cross-bedded conglomerate and sandstone with some shale
Dck	Devonian - Catskill Formation	chiefly red to brownish shales and sandstones

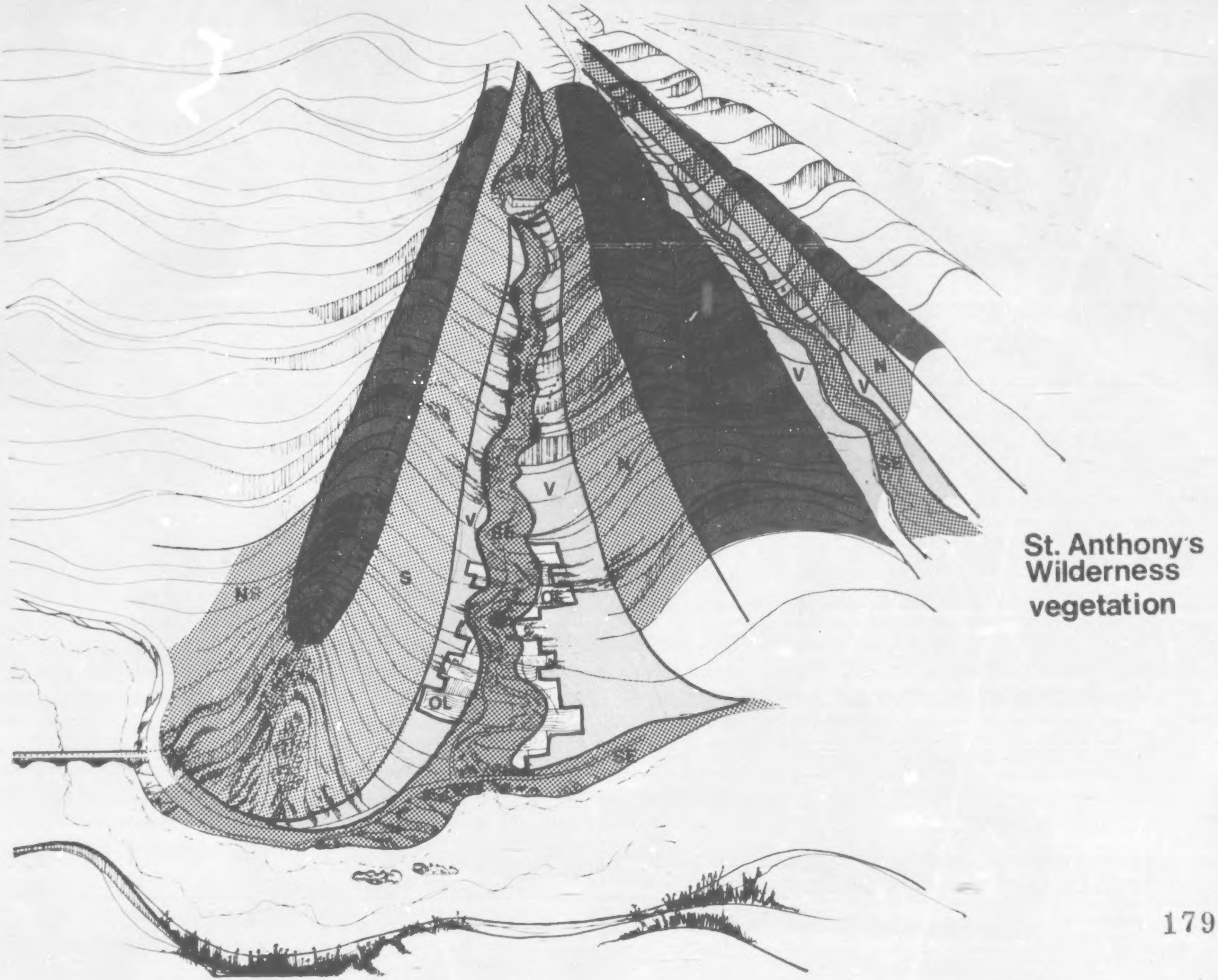

K
Mp
Mmc
Pp
Mmc
Mp

St. Anthony's Wilderness geology

176

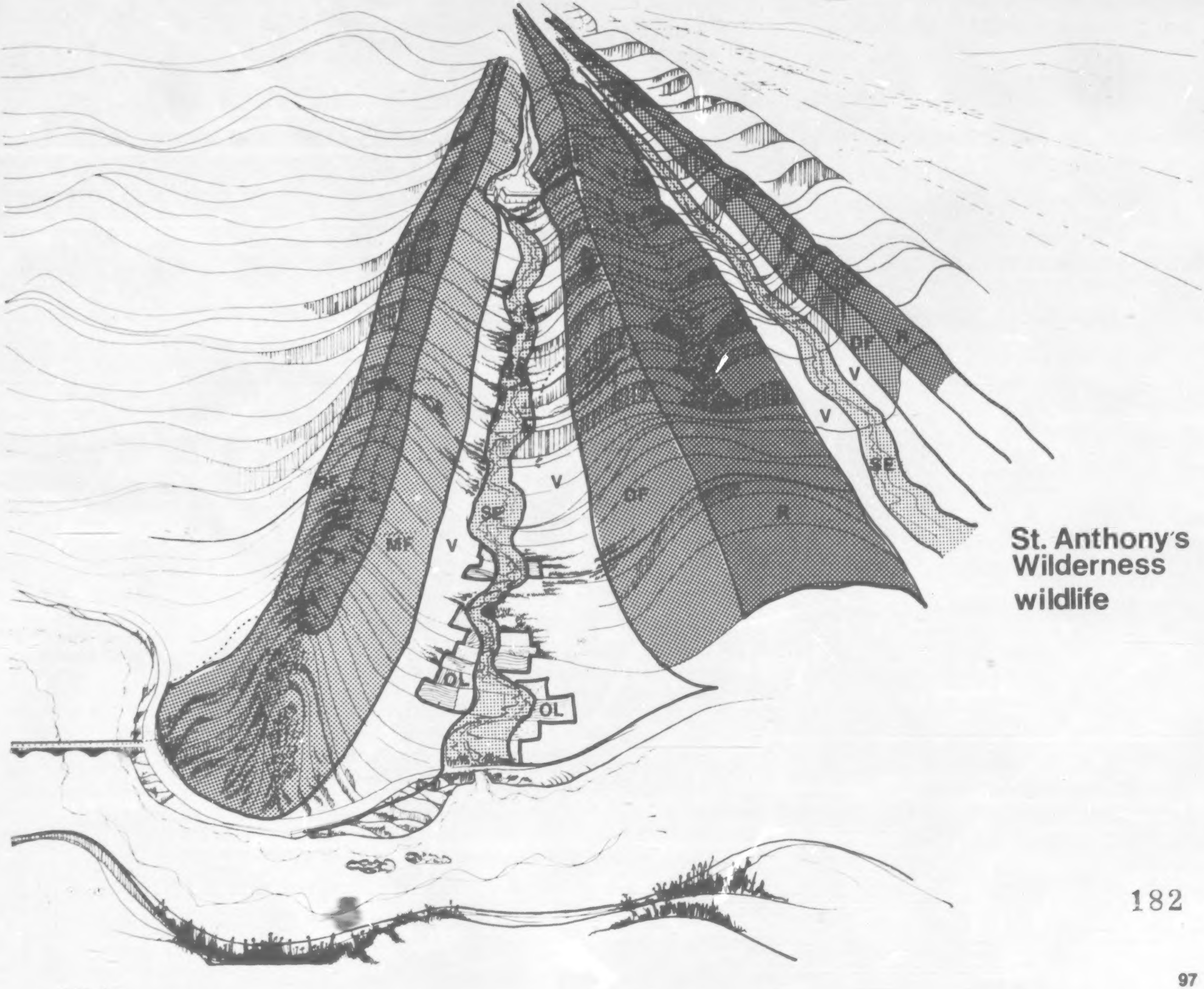
175

R	Ridge Tops	red, black, white, scarlet, chestnut and bear oak; stunted growth; sandstone ridge tops the bear oak is dominant; also dwarf chestnut oak, sassafras. pitch pine and whitchhazel
N	Northern Slopes	mainly white oak; also chestnut, black, red and scarlet oak; scattered hemlock; understory sparce
S	Southern Slopes	scarlet oak and pine are dominant; also chestnut, white, black and red oak; understory--heaths and sweet fern; understory sparce
V	Valley Floors	white oak dominant in non-cultivated areas; also tulip trees, red and black oaks; hickory and white pine; understory is the same
SE	Stream Edges	mixed mesophytic forest types--beech, Tilia heterophylla, Tilia neglecta, Acer saccharum, Quercus borealis, Quercus alba, Fraxinus americana; ferns and spring geophytes
OL	Open Land	same as stream edges; also urbanized areas


N
S
V
SE
N
V
N
V
SE
OL
SE

St. Anthony's Wilderness vegetation

R	Ridge Tops	almost barren of wildlife; few species of mammals--mostly squirrels and other rodents; several species of birds
DF	Deciduous Forests	few species of mammals--mainly chipmunk, opossum and other rodents; large number of species of reptiles and birds
MF	Mixed Forests	variety of mammals--chipmunk and squirrel are dominant; several species of reptiles--wood turtle is dominant; variety of bird species--woodpecker, hawk and grouse are dominant
V	Valleys	rich in wildlife types; not only many species of birds, reptiles, amphibians and small mammals, but also several of the large mammals--black bear, deer, skunks, raccoons and others
SE	Stream Edges	extremely rich in wildlife with many species of reptiles and amphibians as well as most bats and several other mammals--otter, mink, muskrats and rabbits
	Stream Beds	contain all species of fish, as well as an occasional beaver, otter or muskrat
OL	Open/Agriculture	large variety of mammals--shrew, cottontail, red fox and small rodents dominant; limited species of reptiles--snakes; variety of birds--starling, hawk and ring-necked pheasant dominant


MF
V
SF
OL
OL
V
OF
R
OF
R
V
V
SF

St. Anthony's Wilderness
wildlife

182

181

1 CLARKS FERRY BRIDGE

2 ROCK OUTCROP occurred as a stream cut and is overlooking the Susquehanna and Juniata Rivers.

3 WILDLIFE CONSERVATION AREAS are areas provided by the Pennsylvania Game Commission.

4 DEVILS RACE COURSE is located on state game lands 211 on the west branch of Rattling Run. The "Race Course" is similar to the boulder field of Hickory Run State Park. The Devils Race Course, also called the "River of Boulders," is comprised of rounded blocks of white quartzite conglomerate rock that vary greatly in size, with some being relatively small and others as large as a house. There is an underground stream flowing beneath this "River of Boulders" and is quite audible as it rushes to its juncture with Rattling Run.

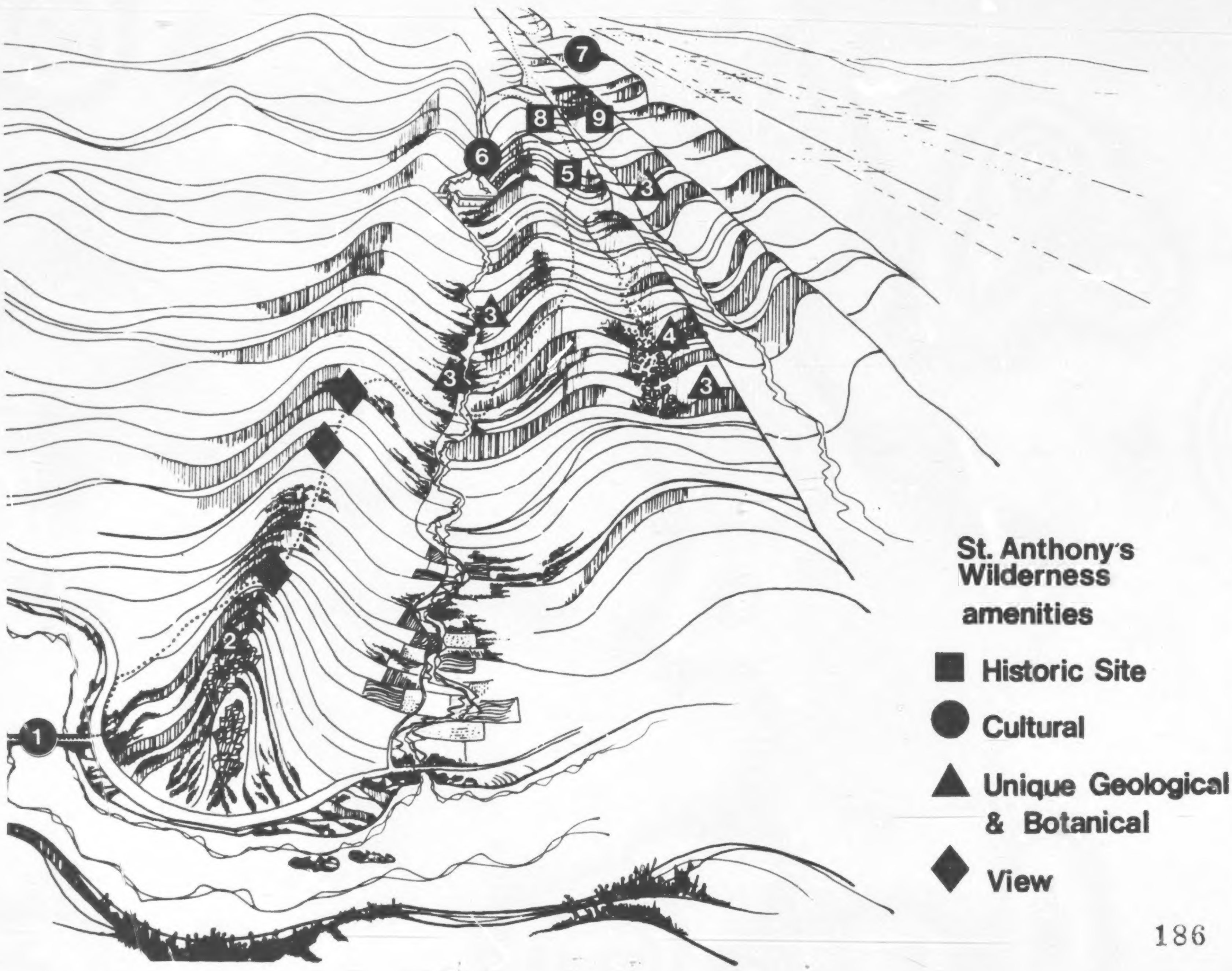
5 YELLOW SPRINGS RUINS are the remaining vestiges of a mining town that flourished in the mid 1800s. Among the vegetation in the area one can locate the foundations of the original structures.

6 HARRISBURG WATER SUPPLY RESERVOIR

7 RAUSCH GAP RUINS are located on either side of Rausch Creek. Among the remains of this old town are two massive stone structures that by their location indicate they may have been abutments for a large railroad bridge.

8 STONE TOWER is a massive stone structure located approximately one-quarter mile north of the Appalachian Trail. The tower dates back to the 1800s and is presumably related to a deep coal mining shaft located nearby.

9 COLD SPRINGS was once a favorite resort spot for the aristocracy and was famed for the therapeutic effect of the spring water. The train station serving the resort on the long abandoned Schuylkill and Susquehanna railroad still stands along the grade. Ruins of the resort itself are located nearby.


1
2
3
3
3
3
4
5
6
7
8
9

St. Anthony's Wilderness amenities

■ Historic Site

● Cultural

▲ Unique Geological & Botanical

◆ View

Kittatinny Mountain

This segment of the Trail extends from the Lehigh Water Gap to the Delaware Water Gap along Blue and Kittatinny Mountains. To the south of Kittatinny Mountain, are located communities, farmland and a few slate quarries. The people from these communities are not extensive users of the Appalachian Trail. However, to the north, in the mountains running parallel to Kittatinny, lies the extensive Pocono Mountain recreational development. Recreational activities vary from skiing, auto racing, hunting and fishing to seasonal residential recreational communities.

Most of the problems confronting the Trail result from the pressures of the Pocono recreational developments. The Appalachian Trail is presently approaching the point of overuse. This, combined with developmental pressures, is seriously threatening the quality of the Trail corridor.

Costly rerouting, rebuilding, tightening of management controls, and/or a combination of these actions may be necessary. A system of secondary trails could be developed to ease the burden on the Appalachian Trail. Shorter loop trails for area residents and tourists could be blazed. These may link with the Appalachian Trail, but should not incorporate it as a major part of the loop. Recreational support areas desired for shorter loop trails should not be located on or near the Appalachian Trail.

A less urgent problem is the routing of the Trail through the six gaps in the segment. Present routing usually places the Trail down one side of the mountain and through the gap. The excellent views from the point of the mountain are lost. Moving the Trail to take advantage of these views would add to the quality of the hiking experience.

ALTERNATIVE 1

This alternative retains a relatively direct routing for the Appalachian Trail. Still, the Trail takes advantage of the most significant interest point, Wolf Rocks. The Trail often runs close to the steep side slopes to offer excellent vistas for the hiker. If the Trail could be redesigned in the gap areas, Trail layout would be at an optimum level.

The Appalachian Trail would have to be moved to the north side of Kittatinny Mountain if an access road for the proposed development in the area were built within the present Trail corridor.

ALTERNATIVE 2

The Trail is screened from any development on the flat ridge top by rerouting it to the steep lands of the Kittatinny northern slopes. This is a costly alternative due to the extremely steep slopes. Again, Wolf Rocks would be located within the Trail corridor.

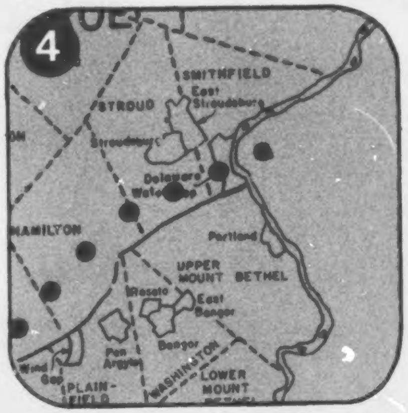
p. 100 blank

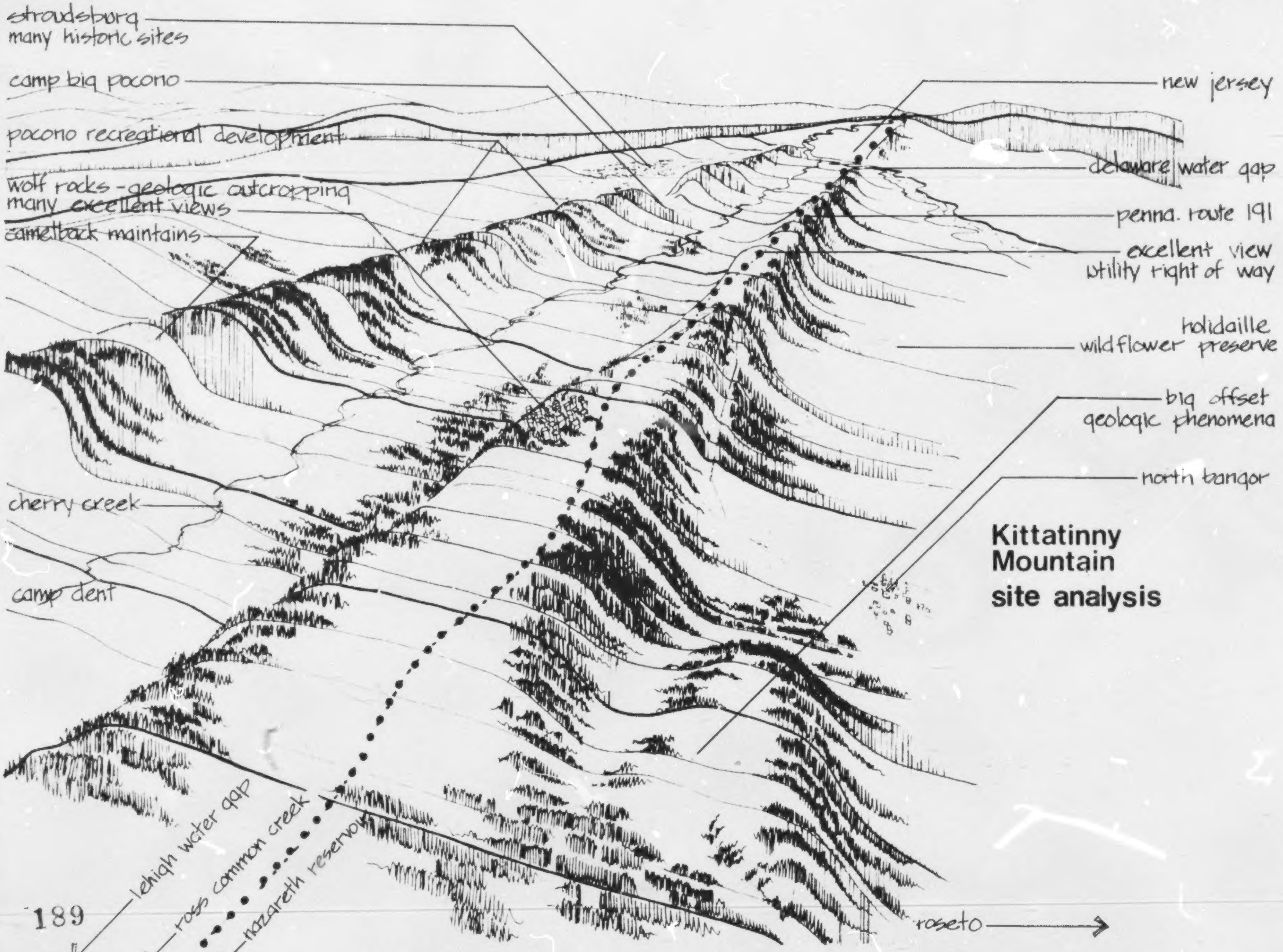
LOOPS

The loops shown are designed to accommodate both one day hikes of two to five miles and overnight hikes covering about ten miles. The Appalachian Trail would benefit from these secondary systems in two major ways: easing of overuse pressures, and provision of access to points of interest currently difficult to reach.

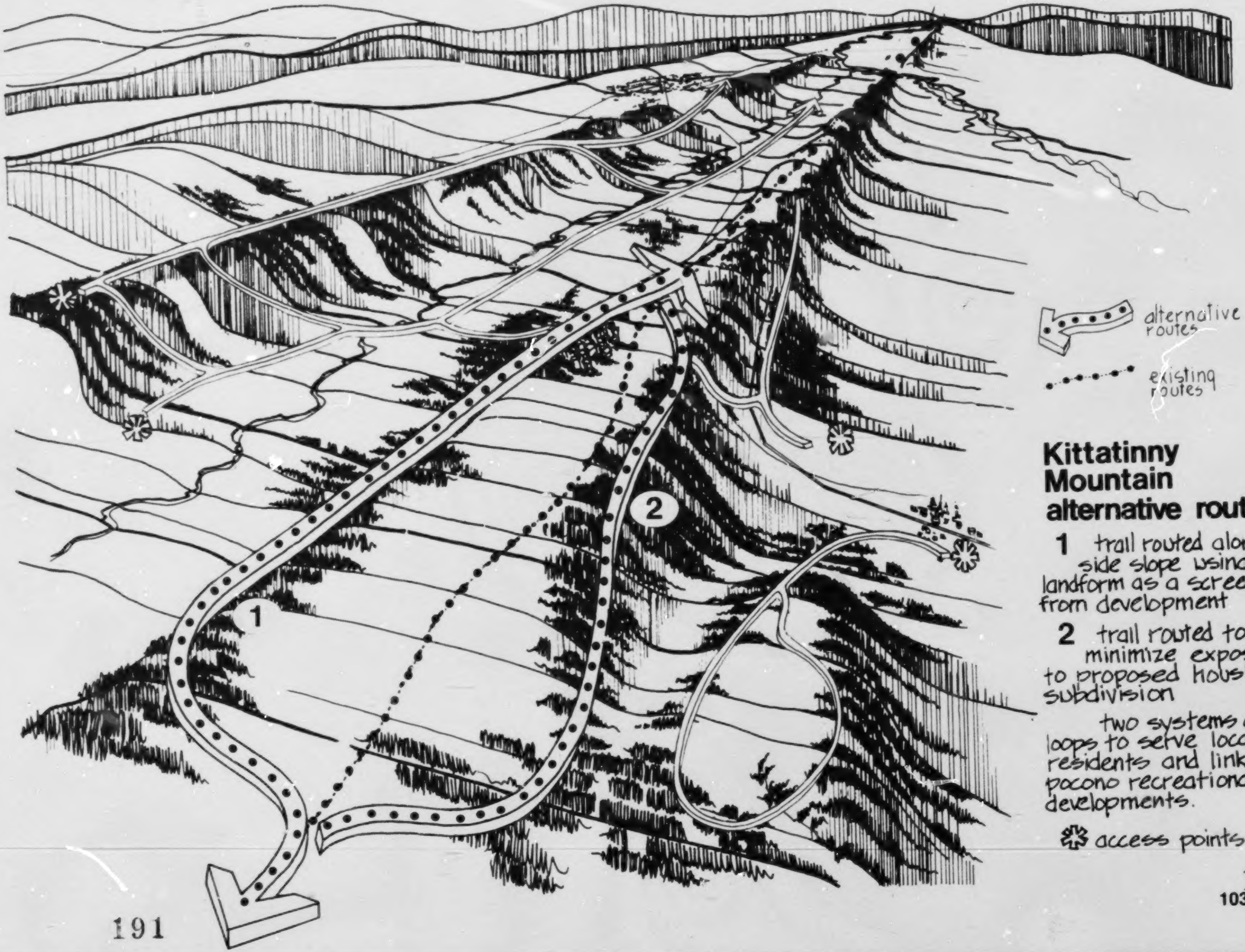
The two trails located to the south of Kittatinny Mountain may serve local residents. They are short one day trails that proceed from the valley up the mountain side and back down into the valley. The hiker can reach Wolf Rocks, a regional point of interest affording excellent, unique views, by traveling the Appalachian Trail a short distance.

The "Pocono Trail System" offers longer trails that might link to some of the recreational developments. These trails offer an overnight hiking experience, and could also relieve overuse pressures on the Appalachian Trail. A link with the shorter loop trails at Wolf Rocks expands the hiking potential, and provides a major point of interest for the "Pocono System." Hiking along Cherry Creek could also be possible.




stroudsburg
many historic sites
camp big pocono
pocono recreational development
wolf rocks - geologic outcropping
many excellent views
camelback maintains
cherry creek
camp dent
lehigh water gap
ross common creek
nazareth reservoir
new jersey
delaware water gap
penna. route 191
excellent view
utility right of way
holidaille
wildflower preserve
big offset
geologic phenomena
north bangor
roseto

Kittatinny Mountain site analysis


alternative routes
existing routes
1
2

Kittatinny Mountain alternative routes

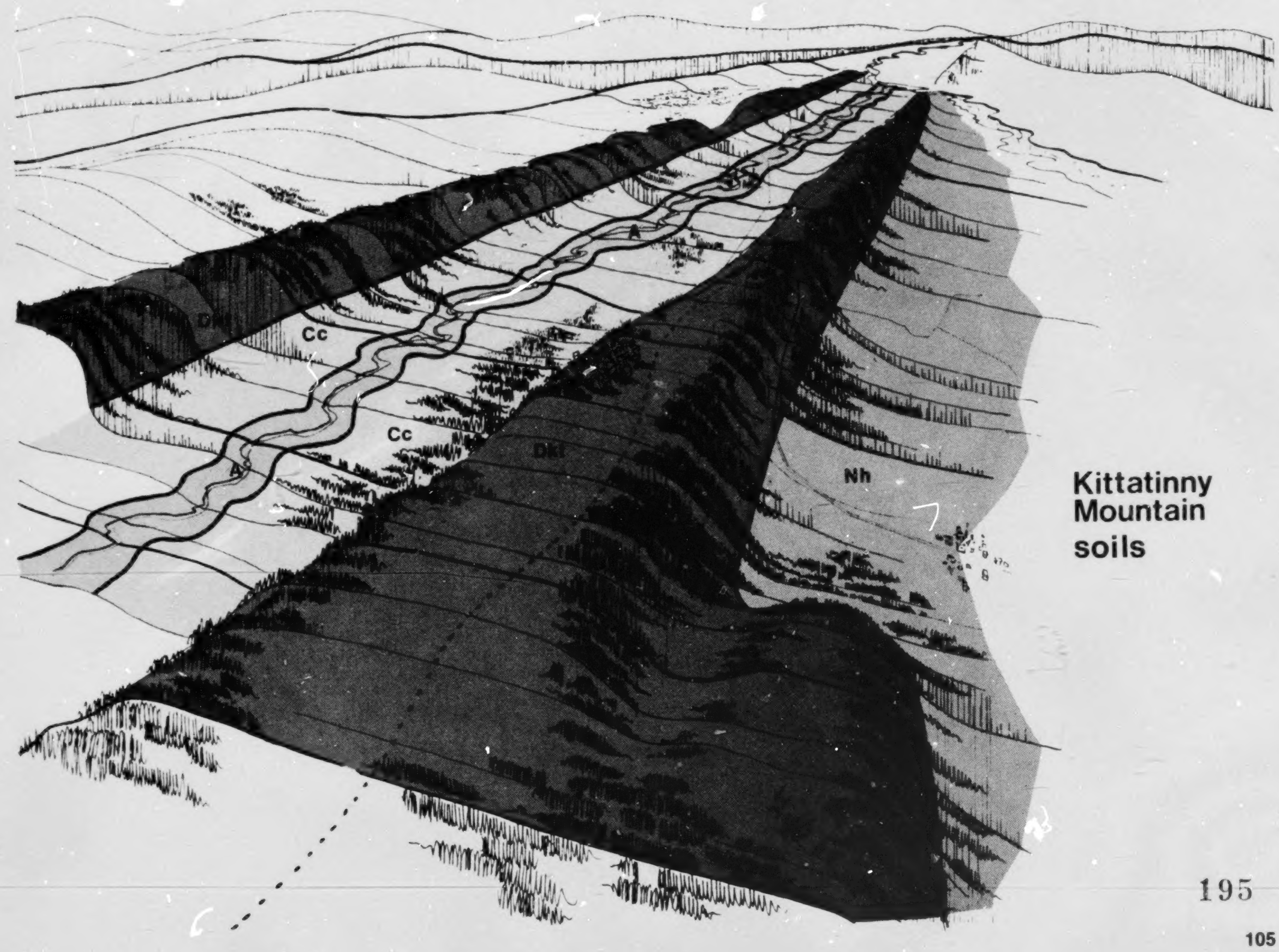
1 trail routed along side slope using landform as a screen from development

2 trail routed to minimize exposure to proposed housing subdivision

two systems of loops to serve local residents and link pocono recreational developments.

✻ access points

Dkt	Appalachian Dekalb-Lehew-Laidig	good drainage, yellowish gray with grayish yellow to brown sub-soil, slope range 15-45%, average slope 25%, stony sandy loam, residual to semi-residual, geologic source--gray and brown acid sandstones, location--Appalachian mountain ridges
Nh	Northampton Kistler	good drainage, brownish gray with dark grayish sub-soil, slope range 2-15%, average slope 6%, silt loam to shaly loam, geologic source--dark gray neutral silty mud shales, location--Northampton County
Cc	Cattaraugus Culvers	good drainage, grayish brown to brown with greenish brown to gray sub-soil, slope range 3-20%, average slope 8%, silt loam, Wisconsin Ice Age Deposits, geologic source--greenish gray acid Catskill shales and sandstones, location--Northern Allegheny Plateau
A	Alluvial Flood Plain	fair to poor drainage, brown to gray, slope range 0-5%, average slope 2%, silty to sandy, alluvial flood plain deposits, geologic source--yellowish gray acid sandstones and shales, location--Alluvial Flood Plain

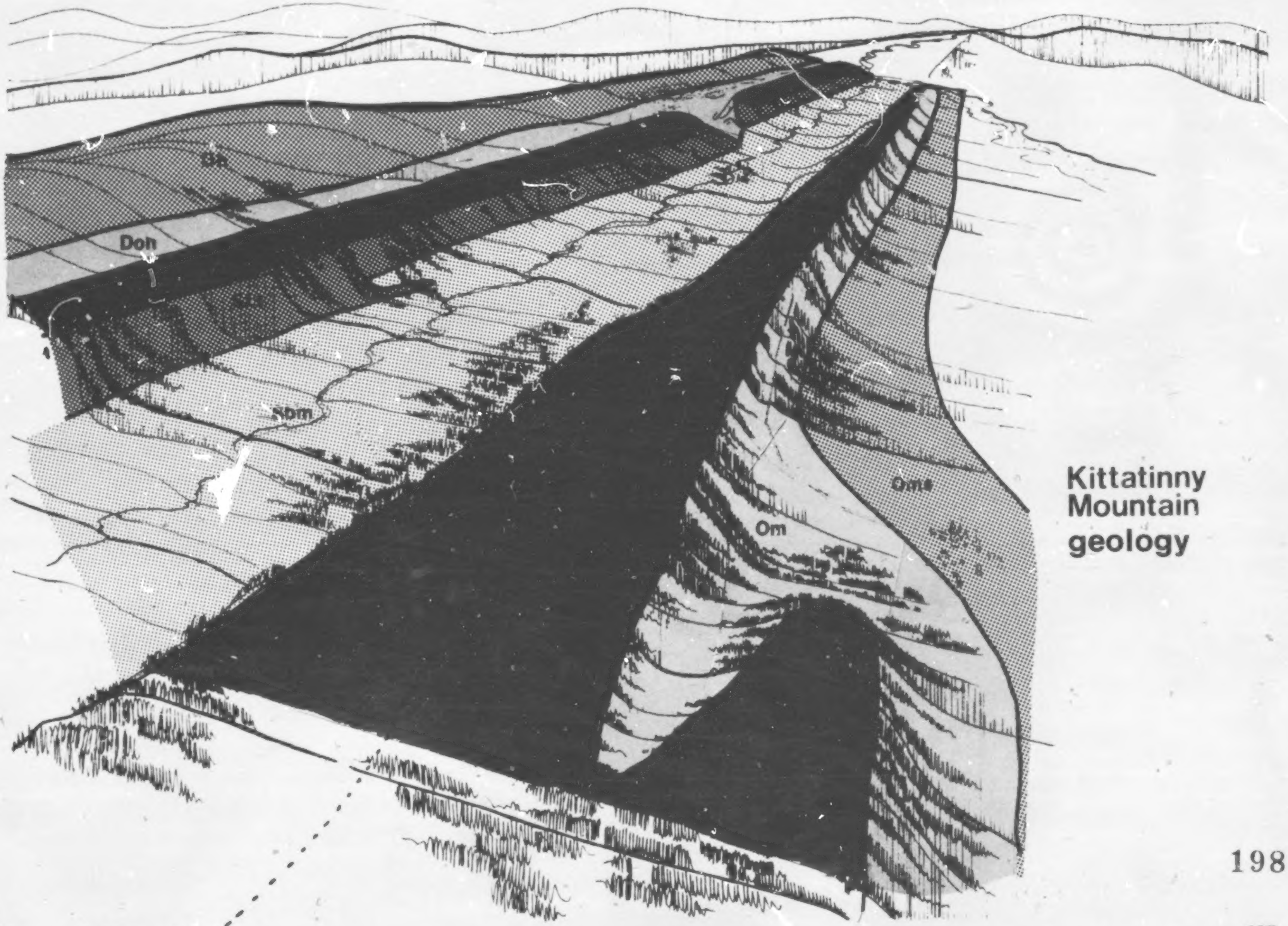

Dkt
Cc
Cc
A
A
Dkt
Nh

Kittatinny
Mountain
soils

195

194

Dh	Hamilton Group	shale with interbedded sandstones and limestones
Don	Onondaga Formation	greenish blue, thin bedded shale with dark medium bedded limestone
Doh	Oriskany & Helderberg Formations	conglomeratic sandstone with thin bedded shale and limestone
Skt	Keyser Formation	dark gray, thick bedded limestone
	Tonoloway Formation	gray, highly laminated, thin bedded limestone
Sbm	Bloomsburg Formation	red, thin and thick bedded shale and siltstone
	McKenzie Formation	greenish gray thin bedded shale with gray thin bedded limestone
Ss	Shawangunk Formation	light gray-tan thick bedded quartzite sandstone and conglomerate with thin shale interbeds
Om	Martinsburg Formation	gray to dark gray, light gray to olive weathering shale with thick sandstone interbeds
Oms	Martinsburg Formation	interbedded red shale, gray to brown sandstone and thin bedded limestone

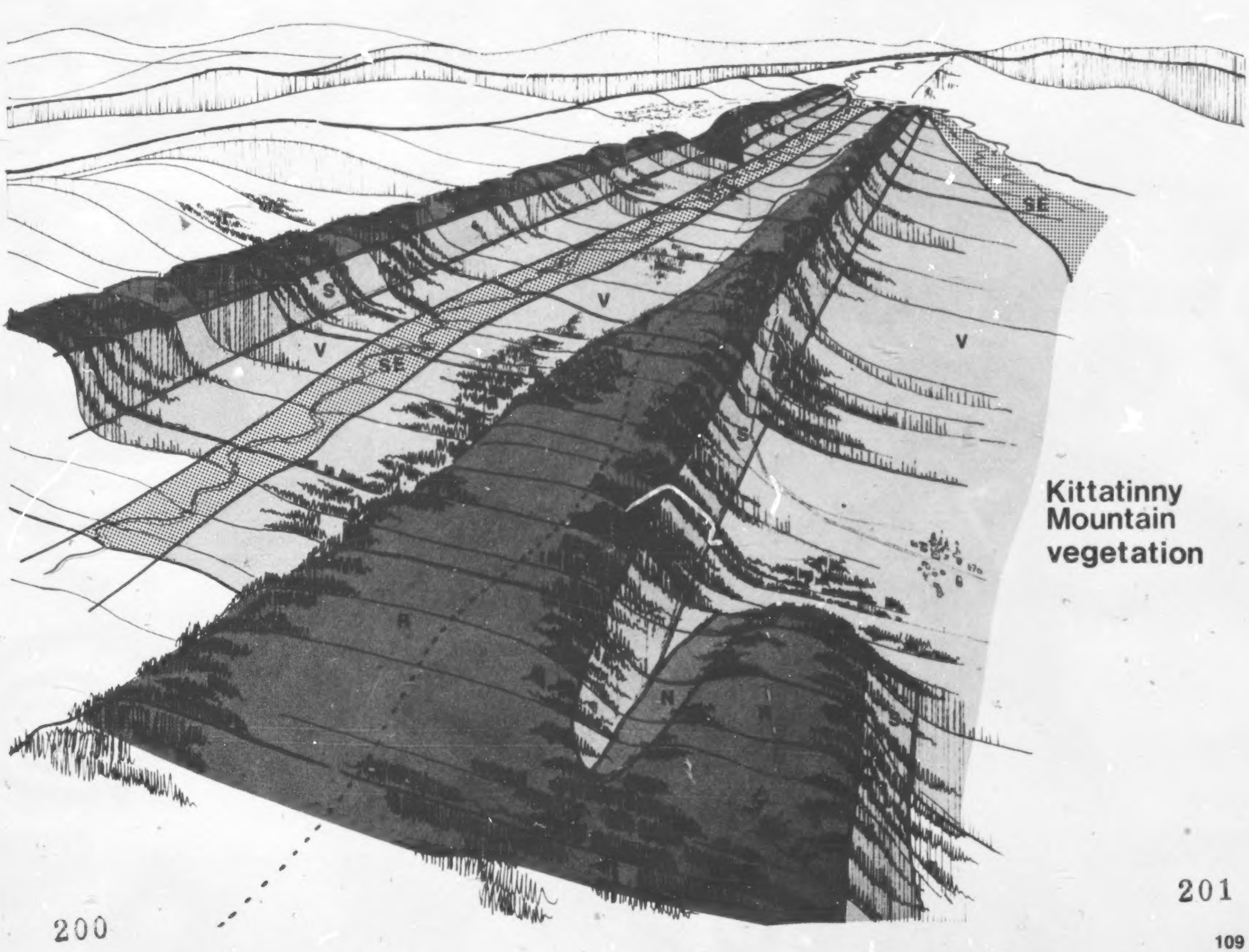

Don
Sbm
Oms
Om

Kittatinny
Mountain
geology

198

197

R	Ridge Tops	red, black, white, scarlet, chestnut and bear oak; stunted growth; sandstone ridge tops the bear oak is dominant; also dwarf chestnut oak, sassafras, pitch pine and whitchhazel
N	Northern Slopes	mainly white oak; also chestnut, black, red and scarlet oak; scattered hemlock; understory sparce
S	Southern Slopes	scarlet oak and pine are dominant; also chestnut, white, black and red oak; understory--heaths and sweet fern; understory sparce
G	Gaps	hemlock and red maples are dominant; also white pine, red oak, tulip trees, basswood, sweet birch, ash and hickory; understory--rhododendron; lush vegetation
V	Valley Floors	white oak dominant in non-cultivated areas; also tulip trees, red and black oaks, hickory and white pine; understory is the same
SE	Stream Edges	mixed mesophytic forest types--beech, Tilia heterophylla, Tilia neglecta, Acer saccharum, Quercus borealis, Quercus alba, Fraxinus americana; ferns and spring geophytes

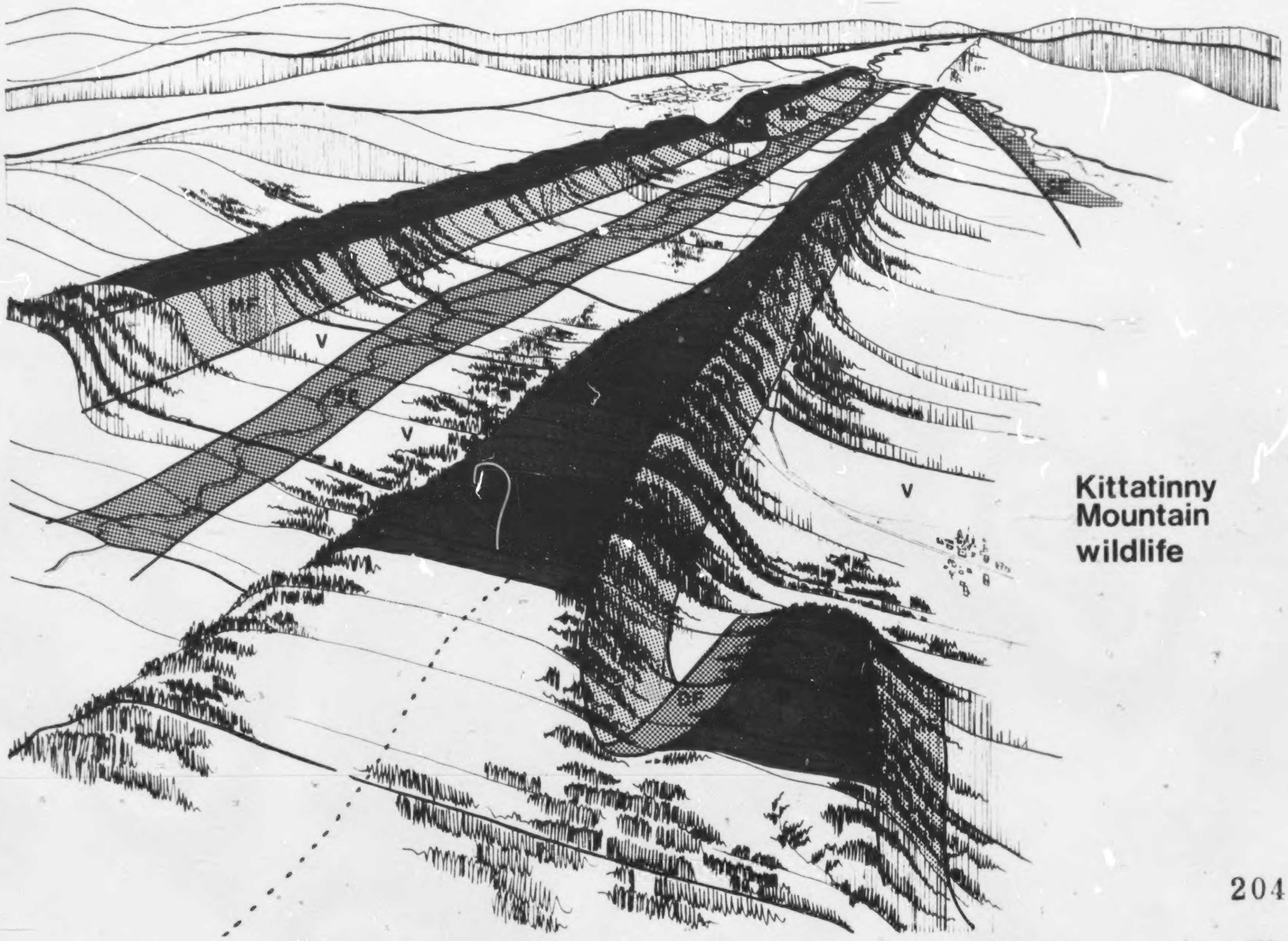

S
V
SE
V
SE
V
S
R
N
R
S

Kittatinny Mountain vegetation

200

201

R	Ridge Tops	ridge tops are almost barren of wildlife; with only a few species of mammals--mostly squirrels and other rodents; commonly found there along with several species of birds
DF	Deciduous Forests	few species of mammals--mainly chipmunk, opossum and other rodents; large number of species of reptiles and birds
MF	Mixed Forests	variety of mammals--chipmunk and squirrel are dominant; several species of reptiles--wood turtle is dominant; variety of bird species--woodpecker, hawk and grouse are dominant
CP	Conifer/Pine	gap locations; few species of mammals--squirrel and snowshoe hare dominant; large variety of reptiles; many species of birds--woodpecker, hawks and ruffed grouse dominant
V	Valleys	area much richer in wildlife types; not only many species of birds, reptiles, amphibians and small mammals, but also several of the large mammals--black bear, deer, skunks, raccoons and others
SE	Stream Edges	extremely rich in wildlife with many species of reptiles and amphibians as well as most bats and several other mammmals--otter, mink, muskrats and rabbits
	Stream Beds	contain all species of fish, as well as an occasional beaver, otter or muskrat


MF
V
SC
V
V
SF
SF

Kittatinny Mountain wildlife

204

203

1 BROWN HOUSE is a two-and-one-half-story stucco over stone house built in 1776. Located in Stroudsburg, it possesses excellent interiors and after nineteenth century additions, it includes an entrance porch with classic columns.

2 MONROE COUNTY JAIL in Stroudsburg, is a two-story red brick structure with a flat roof built in 1865. The building has arched windows with molded pediments.

3 DELAWARE AND LACKAWANNA RAILROAD STATION, in East Stroudsburg, was built in 1883 and reconstructed in 1915. The station is a one-and-one-half-story frame structure and was the gateway to the Pocono Mountain Resorts during the heyday of the railroads.

4 HAUSERVILLE CHAPEL, in East Stroudsburg, is a small frame church in "American Gothic" style. Built in 1889, the church features a steeply pitched gable roof and a small entrance porch with arched windows and door.

5 DR. REEVE'S HOUSE, built in 1840 in Stroudsburg, is a two-story frame house. Dr. Jackson is the doctor mentioned in Mark Twain's Innocent's Abroad.

6 A. MITCHELL PALMER HOUSE, built around the nineteenth century, is a very large, three-story frame house with a gambrel roof. Located in Stroudsburg, this was the home of Mr. Palmer while he was United States Attorney General.

7 STARBIRD HOUSE, is a large two-and-one-half-story stone and stucco house built by Jacob Stroud for one of his daughters.

8 JOHN STROUD HOUSE, built around 1795, is a very large, two-and one-half-story stone house with joined gable chimneys.

9 STROUD MANSION, located on Main and Ninth Streets in Stroudsburg, was built in 1795. The mansion is a three-and-one-half story stucco over stone house with a fine fanlight entrance. The interior woodwork is of excellent quality. Daniel Stroud, the founder of Stroudsburg, began laying out the streets and selling building lots in 1804.

10 KELLER'S REFORMED CHURCH, on Cherry Road west of Delaware Water Gap, was built in 1828. The small stone building, with its simple gable rood, is one of the earliest church buildings in Monroe County.

11 CHURCH OF THE MOUNTAIN is a gothic style brick church with a short corner tower. Located in Delaware Water Gap and built in 1854, the church's eaves are highly decorated in the gingerbread style.

12 DELAWARE WATER GAP, originally named Dutotsburg for Antoine Dutot who settled there in 1790. The village bacame a summer resort area and the Kittatinny Hotel (1831-1931) and Water Gap House (1874-1915) catered to many notables, including presidents and movie stars.

13 ANTOINE DUTOT SCHOOL is a two-story brick schoolhouse with a small bell cupola. The school was founded around 1820 by Antoine Dutot, a French emigrant, who also founded the town of Delaware Water Gap.

14 GLENWOOD is a four-story brick building with a mansard roof and Victorian front porch. Built originally as a boys' boarding school in 1855, it was converted into a hotel in 1865.

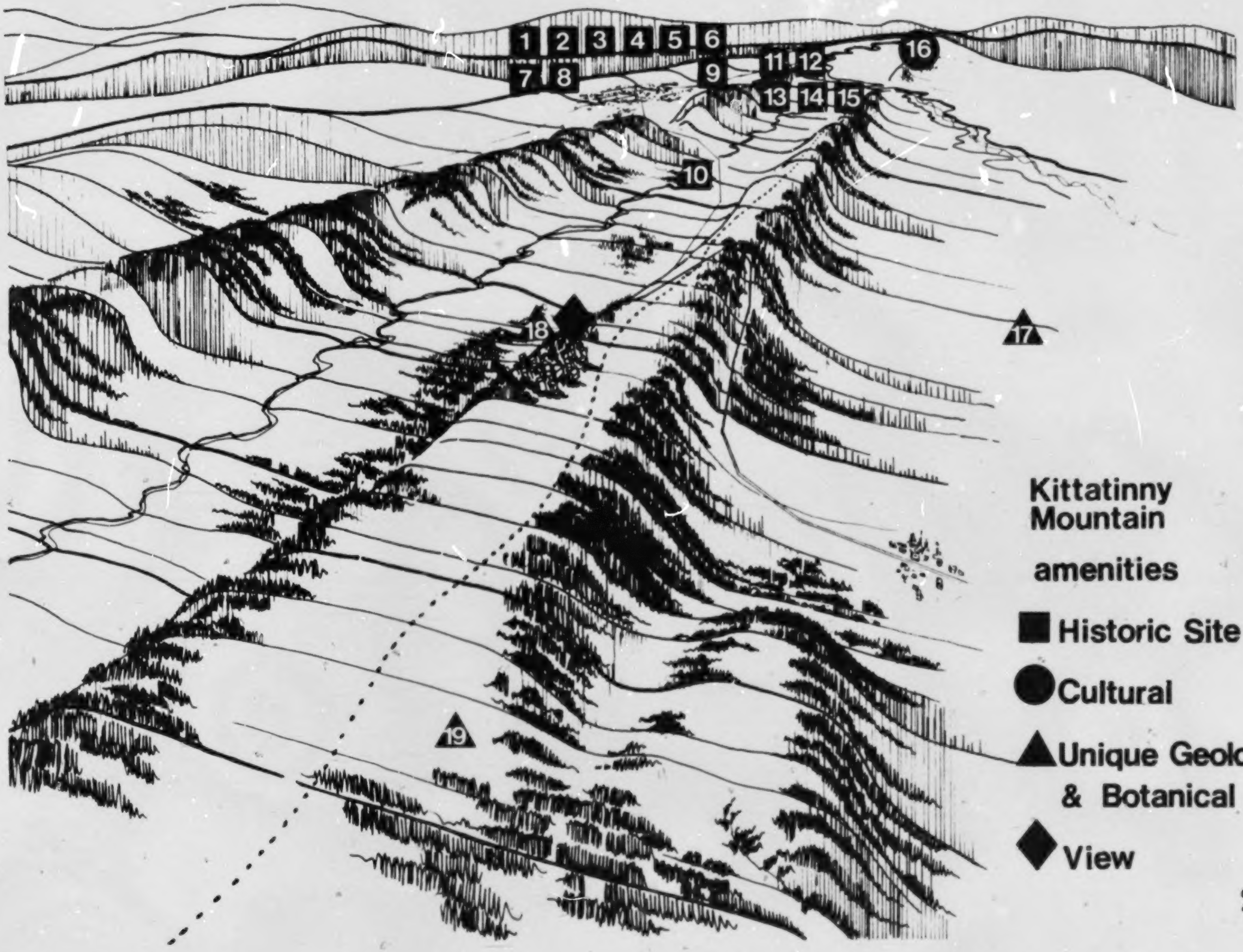
15 SCHOOL is a large two-story brick schoolhouse with a small belfry in the center of the roof and a small frame entrance porch. The school was built around 1855.

16 WORTHINGTON STATE FOREST NEW JERSEY

17 HONDAILLE WILD FLOWER PRESERVE

18 WOLF ROCKS is a rock outcrop located atop Kittatinny Mountain providing a panoramic view of the area to the north.

19 GEOLOGIC OFFSET


1
2
3
4
5
6
7
8
9
11
12
16
13
14
15
10
18
17
19

Kittatinny Mountain amenities

- ■ Historic Site
- ● Cultural
- ▲ Unique Geological & Botanical
- ◆ View

208

207

p. 114 blank

Conclusions

Conclusions

Summary

With increasing developmental pressure being asserted on our land resources, there is a need for identifying unique areas that, once destroyed, may never be recouped. Many of the areas that are suffering from developmental encroachment are located on or along the Appalachian Trail corridor, extending from Maine to Georgia. The Appalachian Trail Study Group in this investigation has attempted to provide a workable trail protection strategy for use by local planners and all others concerned with protecting this Trail.

The strategy devised consisted of five steps from the pre-development planning of land utilization to better design solutions for those segments passing through various land developments. If an acceptable solution were agreed upon, at an early stage in the strategy, the remaining steps need not be completed. This would allow for maximum protection of the trail without unnecessary time and monies being expended. As was mentioned in the introduction to the strategy, if the initial pre-development step were undertaken there would be no need for this subsequent trail protection strategy.

The greatest impact this study could make on planners, governmental officials, and the public at large would be to foster an appreciation of the Appalachian Trail. A further impact of the study may be to stimulate interest in the Trail and increase the awareness of many who do not know of its existence.

Constraints

The Study Group consisted of and predominantly utilized Landscape Architects for basic sources of information. The study, therefore, places a great deal of emphasis on physical design solutions for the Trail. If this study were to be replicated at a later time, the Study Group recommends that a more representative multi-disciplinary group be formed.

This study was a pioneer effort by the Study Group in delineating specific ranges of trail environmental corridor widths. The only way, perhaps, in which the accuracy of these corridor widths may be tested is after they have been established and a survey of the hiker-users has been conducted. Changes may need to be made and perhaps more definitive landform and vegetative types included. Moreover, the study deals with protecting the delineated trail corridors from outside influences; however, it may not protect it from internal influences. The trail may, for example, suffer from overuse by hikers; management solutions for these problems in the study have been confined to the recommended introduction of loop trails and separation of park trail systems.

A further constraint was the time allowed for the study and the subsequent inability of the Study Group to conduct indepth natural resource inventories of the four specific sites: (1) Michaux State Forest, (2) Cumberland Valley, (3) St. Anthony's Wilderness, and (4) Kittatinny Mountain.

Recommendations

Municipalities along the Trail should recognize that they have in their backyards a resource of national significance, important to all citizens of this Commonwealth and Nation. Whether by previous non-recognition of its value, or lack of understanding of whose role it is to conserve the Trail, or whatever, development has been permitted to adversely affect the Trail. While development must and will continue, it should be done in such a way that it enhances the Trail, or, at the very least, doesn't have a negative impact. Local governments, exercising the major control over land uses in this State, have it within their power to accomplish this, and hopefully, will realize that as one of their responsibilities.

It is recommended that all municipalities in the state have natural resource inventories and vulnerability studies conducted in their areas of jurisdiction, irrespective of whether they embrace the trail. These studies would not only aid in the protection of the Trail but would be invaluable in determining the suitability of any land development.

The information contained in this report is meant to be utilized for development along or on the Trail; it is not meant for development in general. Although many of the ideas were drawn from general development guidelines it was modified to fit the Trail situation.

The value of this study may only be determined over time, but it is now that some steps should be taken in the protection of Pennsylvania's natural environment. If the Study Group has made an impact in creating more concern for future planning decisions, then the effort in carrying out this study will have been successful.

References

[1] Robert C. Lucas, "Hikers and Other Trail Users," Recreation Symposium Proceedings (State University of New York College of Forestry, N.Y., 1971), P. 114.

[2] Elwood L. Shafer, Jr. and James Meitz, "Aesthetic and Emotional Experiences Rate High with Northwest Wilderness Hikers," Environment and Behavior, I (December, 1969), p. 191.

[3] David E. Gray, "Identification of User Groups in Forest Recreation and Determination of the Characteristics of Such Groups," (unpublished Ph.D. dissertation, University of Southern California, 1961), p. 148.

[4] Ibid., p. 154.

[5] Ibid., p. 162.

[6] Lucas, Hikers and Other Trail Users, p. 115.

[7] Ibid., p. 118.

[8] Shafer, Aesthetic and Emotional Experiences, p. 195.

[9] Pennsylvania, Constitution, Art. 1, sec. 27.

[10] Pennsylvania Department of Environmental Resources, Bureau of Environmental Master Planning, Environmental Goals of the Commonwealth of Pennsylvania, Feb., 1974, (Harrisburg, PA: Bureau of Environmental Master Planning, 1974), p. 2.

[11] Borough of State College, PA, Code of Ordinances of Borough of State College, No. 874 (1975), p. 1.

[12] Andrew B. Kugler, "Highway Planning and Highway Noise Barriers," Proceedings of the 1974 International Conference on Noise Control Engineering, (Washington, D.C., 1974), p. 180.

[13] Beaton and Bourget, Can Noise Radiation from Highways be Reduced by Design?, Highway Research Record No. 232, 1969, p. 1.

[14] Bolt, Beranek and Newman, Community Noise Ratings, Handbook of Noise Control, Chapter 36, p. 13.

[15] Gary O. Robinette, Plants/People/Environmental Quality, (Washington, D.C.: U.S. Department of Interior, National Park Service, 1972), p. 40.

[16] Gerhard Reethof, "Effect of Plantings on Radiation of Highway Noise," (unpublished research report, Pennsylvania State University), p. 12.

[17] Gerhard Reethof, private interview held at Pennsylvania State University, State College, PA, January 14, 1976.

Bibliography

BIBLIOGRAPHY

Bedminster Twp. Environmental Commission, Hillside Ave., Bedminster, N.J. 07921, Municipal Land Use Decisions--the Tools, the Methods. Upper Raritan Watershed Association, Resource Center, Prospect Street, Far Hills, N. J. 07931, Dec. 1974.

Bolt, Beranek, and Newman. Community Noise Ratings. Handbook of Noise Control, Chapter 36.

Borough of State College, PA. Code of Ordinances of Borough of State College No. 874 (1975)

Bourget and Beaton. Can Noise Radiation from Highways be Reduced by Design? Highway Research Record No. 232, 1969.

Brenneman, Russel L. Private Approaches To The Preservation of Open Land, The Conservation and Research Foundation, Mrs. John Merrill, Agent 13, Woodsea Place, Waterford Conn. 06385, 1966.

Cunningham, Robert. Private interview. College of Agriculture, Department of Agronomy, Pennsylvania State University, University Park, PA. January 27, 1976.

DeChiara, Joseph, and Koppelman, Lee. Urban Planning and Design Criteria. 2nd ed. New York: Van Nostrand Reinhold Company, 1975.

Department of the Interior, Bureau of Outdoor Recreation, Northeast Regional Office, 9310 Federal Building, 600 Arch St., Philadelphia, Pa. 19106, Protecting Nature's Estate--Techniques for Saving Land, Dec. 1975.

Gray, David E. "Identification of User Groups in Forest Recreation and Determination of the Characteristics of Such Groups." Unpublished Ph.D. dissertation, University of Southern California, 1961.

Kugler, Andrew B., and Galloway, William J. "Highway Planning and Highway Noise Barriers." Proceedings of the 1974 International Conference on Noise Control Engineering. Washington, D. C., September 30-October 2, 1974.

Lucas, Shafer C. "Hikers and Other Trail Users." Recreation Symposium Proceedings. State University of New York College of Forestry, N. Y. 1971.

McHarg, Ian, Design with Nature, Doubleday/Natural History Press, Doubleday and Company, Inc., Garden City, New York 11530, $6.00.

National Technical Information Service, Springfield, Virginia 22151, Performance Controls for Sensitive Lands: A Practical Guide for Local Administrators, EPA #600/5-75-005, March 1975, $8.00.

Office of Historic Preservation. "Pennsylvania Inventory of Historic Places," Harrisburg, PA., 1973.

Pennsylvania. Constitution

Pennsylvania Department of Community Affairs, Donations of Land (1975), Adding Parkland To Your Community Through Mandatory Dedication (1976), Easements For Recreation and Conservation (1977), Bureau of Recreation and Conservation, 104 South Office Building, Harrisburg, Pa. 17120.

Pennsylvania Department of Environmental Resources, Bureau of Environmental Master Planning. Environmental Goals of the Commonwealth of Pennsylvania, February 1974. Harrisburg, PA: Office of Environmental Master Planning, 1974.

Pennsylvania State University. College of Agriculture. Cooperative Extension Service. Alternate Methods of Effluent Disposal for an On-Lot Home Sewage System. University Park, PA: Cooperative Extension Service.

Reethof, Gerhard. "Effect of Plantings on Radiation of Highway Noise." Unpublished Research Report, Pennsylvania State University.

__________________________. Private interview held at the Pennsylvania State University, State College, PA," January 14, 1976.

Robinette, Gary O. Plants/People/Environmental Quality. Washington, D.C.: U. S. Department of Interior, National Park Service, 1972.

Shafer, Elwood L., and Meitz, James. Aesthetic and Emotional Experience Rate High with Northwest Wilderness Hikers." Environment and Behavior, I (December, 1969), 187-197.

Soil Science Society of America and American Society of Agronomy, 677 South Segoe Road, Madison, Wis. 53711, Soil Surveys and Land Use Planning, Klingebiel, A.A.; Baird, J.V.; and Heddleson, M.R., eds., 1966.

Tri-County Regional Planning Commission. Conservation and Open Space Plan - 1975. Final report updating the Conservation and Open Space Plan developed previously, Harrisburg, PA: Office of the Planning Commission, June 1975.

U. S. Department of Agriculture, Soil Conservation Service. Soil Survey Interpretations for Developing Areas in Monroe County Pennsylvania. Harrisburg, PA: Department of Agriculture, currently being compiled.

__________________________. Soil Survey Interpretations for Developing Areas in Northampton County,Pennsylvania. Harrisburg, PA: Department of Agriculture, 1966.

__________________________. Soil Survey Monroe County, Pennsylvania. Harrisburg, PA: Department of Agriculture, presently being compiled.

__________________________. Soil Survey Northampton County, Pennsylvania. Harrisburg, PA: Department of Agriculture, 1974.

University of California, Department of Landscape Architecture, Berkeley, California 94720, Early Warning System: The Santa Cruz Mountains Regional Pilot Study, Patri, Tito; Streatfield, David C.; and Ingmire, Thomas J., $5.00.

Many people were involved in the preparation of this report. The Penn State senior students in the Department of Landscape Architecture spent many hours in the field and at the drawing board or desk. The faculty at Penn State and personnel from the Department of Environmental Resources and other State agencies provided invaluable guidance to the students, as did representatives from various private societies and associations. The Department of Community Affairs wishes to thank each of these individuals and organizations, and acknowledge their participation in this unique project.

W. Roy

W. Roy Newsome, Jr.
Special Planning Advisor
Pennsylvania Department of Community Affairs
and Project Coordinator for this study

ACKNOWLEDGEMENTS

Original Authors and Primary Researchers

Hans G. Arnold
Edward M. Beidel, Jr.
Robert F. DeLacy
John Saydek, Jr.
Marie T. Scovazzo
Robert M. Shenk
Marcia A. Smouse

Other Senior Class Participants

Gary Barnhart
Thomas Bauer
David Baycura
Steve Behrens
Cynthia Borden
Emilio Chiodo
Daniel Coulter
Mike Covelli
Dennis DeMara
Gary Doerr
Lance Fleming
Doug Fullerton
Joseph Hirschman
Robert Hockenberry
Steve Jensen
Sam Kryder
Kurt Kummer
Donald Miano
Randy Moser
Arthur Ochs
David Peetz
James Pitts
Joseph Sicenavage
Martin McGann-Smith
James Straley
Gary Weber

Pennsylvania State University Faculty

William G. King, Assistant Professor
Department of Landscape Architecture

Daniel R. Jones, Assistant Professor
Department of Landscape Architecture

Anthony M. Battaglia, Assistant Professor
Department of Landscape Architecture

E. Lynn Miller, Assistant Dean for Research
College of Arts and Architecture

Robert L. Cunningham, Professor
Department of Agronomy

G. Reethof, Professor
Department of Mechanical Engineering

Pennsylvania State Government Participants

*William Eichbaum, Deputy Secretary
Department of Environmental Resources

*Caren Glotfelty, Chief, Division of Planning Assistance
Department of Environmental Resources

*Greg Gove, Recreation and Park Advisor
Department of Community Affairs

Ted Kelly, Forester
Department of Environmental Resources

Wilson Oberdorfer, Chief, Bureau of Legal Affairs
Department of Environmental Resources

Nick Vukovich, Division of Land Management
Pennsylvania Game Commission

William Watson, Office of Historic Preservation
Pennsylvania Historical and Museum Commission

Appalachian Trail Conference

Paul Pritchard, Executive Director
*Hank Lautz

Keystone Trail Association - Field Trip Guides

Joe Bell
Roy Fadner
Maurice Forrester
Thurston Griggs
Bob Prichett
Dr. Malcolm White
Bob Wolfe

Cumberland County Historical Society

John C. Fralish, Jr., Asst. Exec. Sec.

Photographic Assistance

Joseph Sicenavage
Rine Neff
Greg Aukamp

Typists

L. Diann McVey and Linda S. Ayers, Secretaries
Department of Landscape Architecture
Pennsylvania State University

*These individuals provided significant assistance in the preparation and revision of this study.

APPENDIX A

Pennsylvania Municipalities Along The Appalachian Trail

County	Township	Trail on Public Land	Trail on Private Land	Compre-hensive Plan	Zoning Ordinance	Sub-Division Ordinance
FRANKLIN	Washington	X	X	X	X	X
	Quincy	X				X
	Guilford	X				X
	Greene	X	X	X	X	X
	Southampton	X				X
CUMBERLAND	Southampton	X				X
	South Newton	X		X	X	C
	Cooke	X				X
	Dickinson	X	X	X	X	X
	South Middleton		X	X	X	X
	Monroe		X	X	X	X
	Silver Spring		X	X	X	X
PERRY	Rye	X	X		X	X
	Penn		X			X
	Duncannon		X			C
DAUPHIN	Middle Paxton	X	X			X
	Reed		X			X
	Halifax	X	X			X
	Wayne	X				C
	Rush		X			C
	East Hanover	X		X	X	X
LEBANON	Cold Spring	X				C
	Union	X	X		X	C
	Swatara	X	X	X	X	C
	Bethel		X	X	X	C
SCHUYLKILL	Pine Grove	X	X		C	C
	Washington	X	X		C	C
	Wayne	X	X		C	C
	South Manheim	X	X		X	C
	West Brunswick	X	X		C	C
	East Brunswick	X	X		C	C
	West Penn	X	X		C	C
BERKS	Bethel	X	X	X		C
	Upper Tulpehocken	X	X			C
	Upper Bern	X	X			X
	Tilden	X		X	X	C
	Windsor	X	X	X	X	C
	Greenwich	X		X	X	X
	Albany	X	X	X	X	X
CARBON	East Penn	X	X			X
	Low Towamensing	X	X			X
LEHIGH	Lynn	X	X	X	X	X
	Heidelberg	X		X	X	X
	Washington	X	X	X	X	X
MONROE	Eldred	X	X			X
	Ross	X	X			C
	Hamilton		X	X	X	X
	Stroud		X	X	X	X
	Smithfield		X	X	X	X
	Delaware Water Gap		X	X	X	X
NORTHAMPTON	Lehigh	X	X	X	X	X
	Moore	X	X	X	X	X
	Bushkill	X	X	X	X	X
	Plainfield	X	X	X	X	X
	Upper Mount Bethel		X	X		X
	TOTALS	42	43	27	33	55

"C" Denotes county ordinance is in force in the municipality

Appendices

APPENDIX B

Note 1

The Trail difficulty, in terms of hiking, should be considered. The Appalachian Trail Conference has maps which hikers may want to obtain. Further, if local clubs are interested in developing maps, they may want to refer to the publications "Biketrips - Southcentral Pennsylvania" and "Biketrips - Southeastern Pennsylvania," by the Pennsylvania Department of Community Affairs, which discuss one means of rating trail difficulty.

Note 2

The National Trails System Act, P. L. 90-543 of 1968, designates the Appalachian Trail as Scenic. Under that Act, the use of motorized vehicles on such a Trail is prohibited.

Note 3

The list of vegetative grouping is applicable to Pennsylvania, but may or may not be appropriate for other states.

Note 4

This case study shows some of the analysis a local government might go through to conserve the Trail after a development plan, which affects the Trail, has been submitted. In this instance, no protective action prior to the development proposal was taken nor is discussed.

Note 5

At present, the Eagles' View situation is in limbo because the developer's proposal is in litigation.